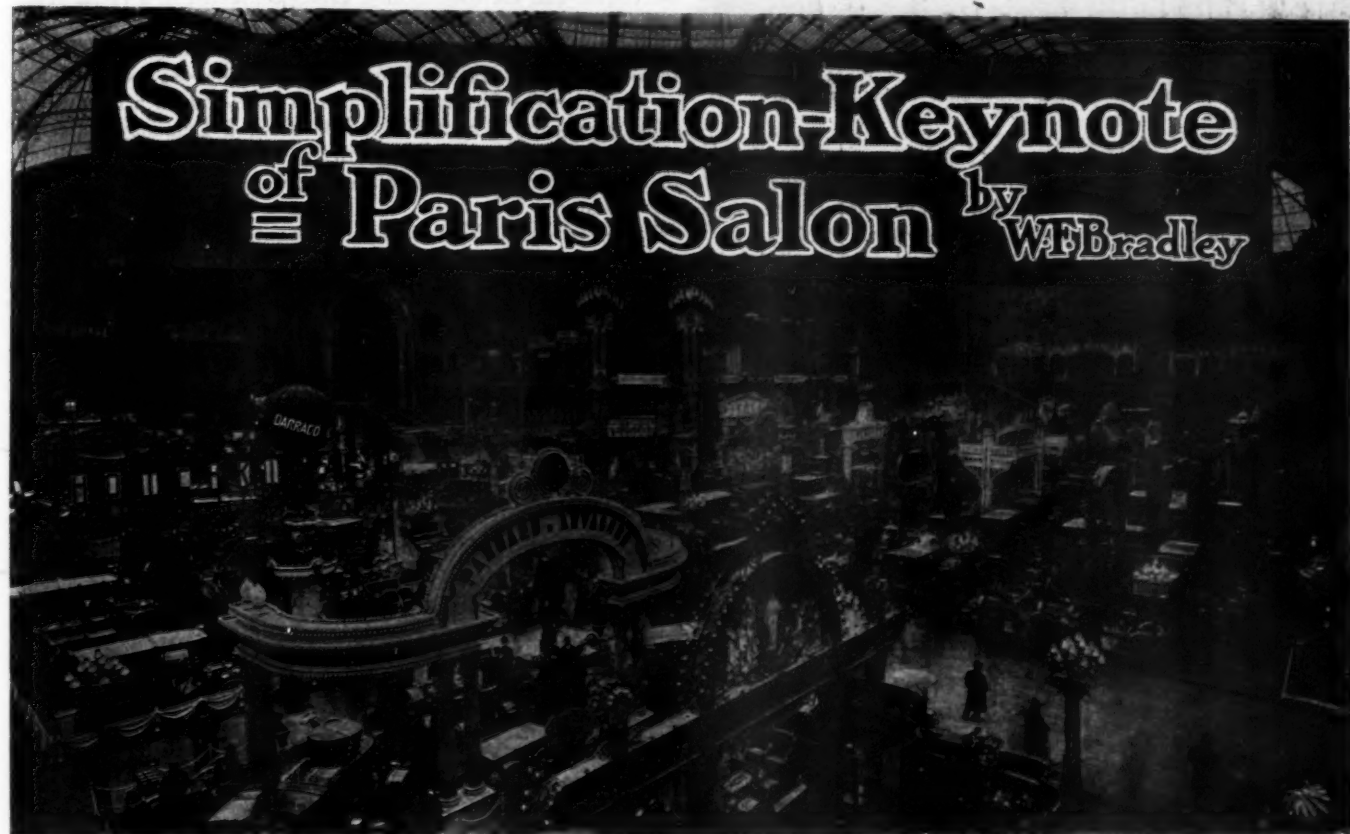


THE AUTOMOBILE

Simplification-Keynote of Paris Salon by W.F. Bradley



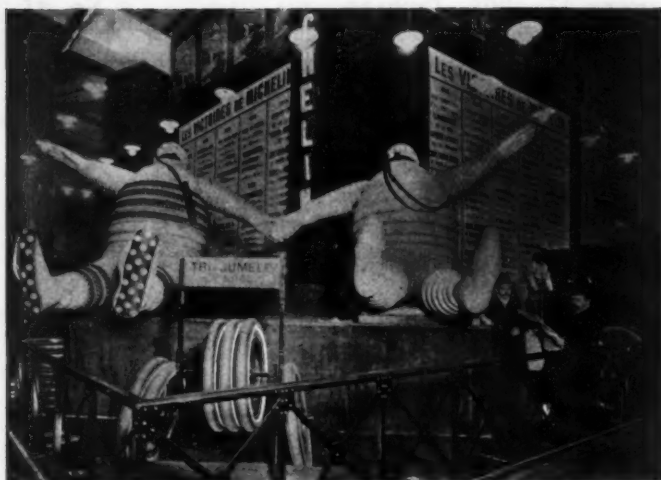
PARIS, Dec. 10.—Simplification is the keynote of the eleventh annual Paris Salon. On the general lines of a design European constructors are pretty well of one opinion and there is no longer a discussion as to cone and disc clutches, shaft and chain drive, high and low tension ignition, selective and progressive gear change, thermo-syphon and pump-water circulation, pressed steel and armored wood frames, etc. While few constructors have made any remarkable changes in their chassis, all of them have sought to simplify them to the greatest possible degree. It is with a view to simplification that low-tension ignition has been abandoned by all the large constructors who up to the present have been its strong supporters. The change has not been made with the object of

allowing a dual ignition to be fitted easily, for the simple reason that dual ignitions are very rare exceptions. Constructors are of the opinion that in the hands of an expert and for racing or demonstration purposes the low-tension system has advantages. But for the ordinary user, who is not an expert at tuning up a car, the high-tension magneto is the best system. This is further proved by the fact that such firms as Brasier, Berliet, Dietrich and Mercedes use the high-tension system for the small cars, likely to be handled by comparatively inexperienced men, and

fit low tension to the powerful models generally driven by a skilled mechanic.

In the desire for simplification this year everything has been swept off the dashboard. The custom of





At the Michelin Exhibit the Bibendum Twins Reigned.

carrying a battery of sight feeds, a big lubricator, pumps, coil, oil, gas and water manometers, etc., in full view of the driver, has been gradually dying out, and it is now an exception to see anything more than a single sight feed and a switch. Panhard, for instance, who formerly made a dashboard display of a coil, lubricator and a few other articles, has simplified this portion of the car to a small sight feed and a switch. The coil is now under the bonnet and the lubricator is placed at the other side of the dashboard. On the new Berliet models there is not even the sight feeds, a plain glass tube oil level being let into the dash, and the two sight feeds for the rear axle and the gear box being under the bonnet. As this firm has abolished pressure-fed gas and oil tank and force feed-water circulation, the three indicators and the pump which were formerly necessary have been swept away.

On the Renault there is an interesting example of the stripping of the dashboard. No changes have been made in the system of lubrication, ignition or method of carrying gasoline tank, but instead of a large lubricator tank immediately in front of the driver there is now but a small sight feed covered over with a glass plate flush with the dashboard, this being one of the neatest arrangements seen at the show. The oil-tank filler is immediately behind the radiator filler, the lubricator having simply been removed from the rear to the front of the board. It was noticed that of all the self starters which attracted so much attention at the show last year the only survivor was the one designed by Louis Renault, and shown on all the big cars of his make. The small self-starter, operated by the foot, was not in evidence.

A simplification of all piping, whether for oil, gas inlet or exhaust, was a notable feature. One of the most striking in this



One of the Largest Displays Was of Continental Tires.

respect was seen on the new Charron two and four-cylinder cars. The float chamber, of the usual type, had its cover laid on the box by a flange only and held in position by a blade spring attached to a vertical spindle. The top of the box came off by merely lifting up the blade. Projecting from the float chamber was a tube the upturned end of which comprised the nozzle. Fitting over it was a plain copper tube with a bell-mouthed bottom, the upper end of which passed into the mixing chamber attached to the inlet manifold; thus the intake piping amounted to a six-inch length of copper tube held by a single screw. As the exhaust manifold was cast with the cylinders and the inlet and outlets for the circulating water were each cast in one piece connected up to the top and bottom of the dashboard radiator by a short length of hose, there was practically no piping on the car. With the magneto at the front of the engine and the four electric cables contained in a metal tube, the maximum of accessibility was obtained. It was noticed that each wire had a number attached to it, indicating the cylinder to which it led. This method of simplifying the water piping as shown on the Charron, was also to be found on a number of other new cars, a notable example being a Delaunay-Belleville six-cylinder with the water outlet in one piece screwed down to the cylinder head and with a single connection to the top of the radiator.

Increased engine accessibility by mounting the radiator on the



Where the Bosch Magnetos Were Shown in Profusion.

dashboard is no longer an exclusive Renault feature, several of the new cars having adopted it. A two-cylinder Berliet intended for taxicab and town work had been fitted in this way with a mass of plain copper tubes uniting an upper and lower tank on the dashboard. Several smaller firms had more or less slavishly copied the same idea. On the new Charron the dashboard radiator was formed of gilled tubes, uniting in an upper and lower tank, but instead of being carried right across the car, the central position, immediately behind the engine, was occupied by a fan driven by belt from the mainshaft. This arrangement added to the width of the radiator, causing it to be carried out to the full width of the side members, though at this point the frame had already been inswept to give the desired steering angle. The result was that the general lines of an otherwise handsome little car were slightly impaired.

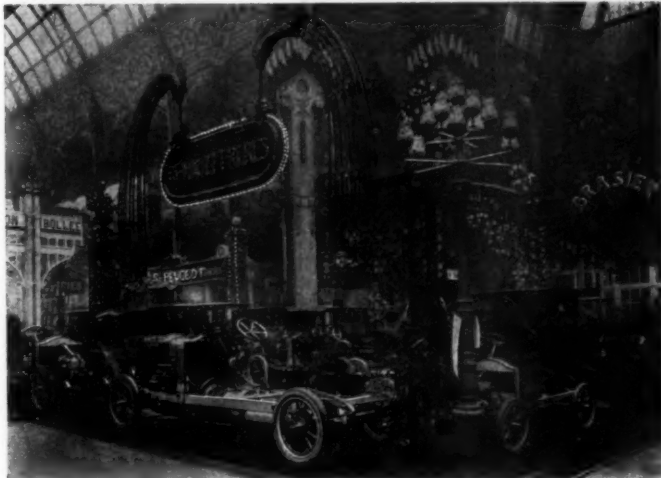
Delahaye and Leon Bollee encased the valves by means of a sheet metal plate secured in each case by a single clip, the general arrangement being somewhat similar to that on the Winton car. When, as on the Delahaye, there was a single length of pipe only for the gas intake, the exhaust and the water inlet and exceptionally clean type of engine was obtained.

The influence of London police regulations on automobile design was shown on all the Darracq models. On the original taxicab model so well known in New York, the magneto was placed on the same side as the carbureter and carried in an

out-of-the-way position under the exhaust manifold. The London authorities, however, now refuse to pass any car for public service unless the carbureter is away from the magneto, with the result that the Darracq company has been obliged to put the magneto to the opposite side of the engine, carrying it on a special bracket cast with the crankcase and held down under a projecting arm from the cylinders. The improvement having to be made for the taxicab, the opportunity was taken of applying it to all models. As a number of French firms have obtained or are seeking the London taxicab business, magneto and carbureter on the same is an exception.

Shaft Drive Gains and Torque Rod Loses Ground.

Final drive by propeller shaft is more common than ever before, for the simple reason that more small cars are built, and European constructors are of the opinion that for low and moderate powers the shaft is preferable. For the highest powered cars, however, final drive by side chains maintains its position, the opinion being that at highest speeds and for heavy cars the chain is much more satisfactory than the cardan. It is an opinion that has grown as the result of racing experience. There is a tendency to get away from the use of a torque rod even on cars of comparatively high power. There was an example in one of the new Renault models, a car of 20-30 horsepower. On the other models from the Billancourt factory tubular torque stays were employed in place of the pressed steel one formerly

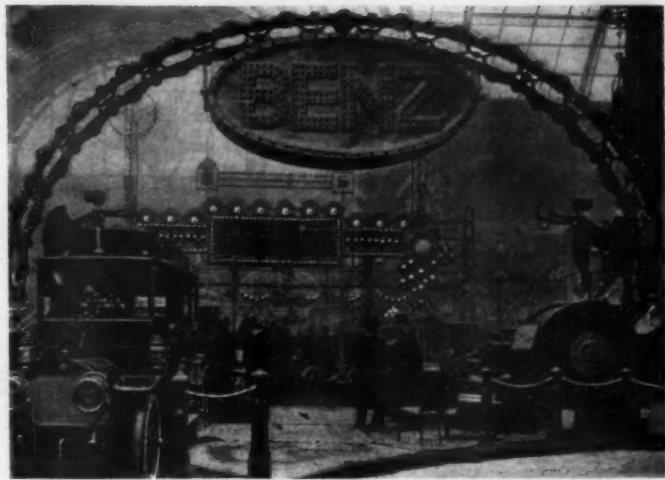


Artistic Showing Made by the Famous Renault Freres.

fitted. The only exception was the small runabout, which had no stay at all. A more general tendency was to strengthen the casing of the propeller shaft, letting it perform the functions of the torque stay. A neat arrangement on the shaft-driven Delahaye was the carrying of distance rods attached to the same hanger as the forward end of the rear spring.

Great Increase in Small Cars and Voiturettes.

Undoubtedly the most interesting work of the show was in the small car and voiturette classes. It is rather difficult to draw a distinct line of demarcation between what is a small car and what is a voiturette, but in the former would certainly be classed the new two and four-cylinder models from such firms as Renault, Brasier, Berliet, Dietrich, Charron, Delahaye, etc., while the voiturettes have as their chief examples such cars as the single-cylinder Sizaire-Naudin, Aries, Werner, Delage, etc. All the large firms, without an exception, have produced a little two-cylinder car of about 10 horsepower, capable of light taxicab work or for use as runabouts. Thus Panhard, in the old school, comes forth with a two-cylinder of this type, with the cylinders in one casting, and the engine forward bolted direct to the side members of the frame. Valves are all on one side, the oil tank is carried between the pair of arms on right-hand side of engine and the carbureter between the corresponding pair on the opposite side, the magneto—a Nilmelior high-tension—being in



The German Benz Had an Exhibit Complete and Unique.

front. Water circulation is by thermo-syphon, with no fan behind the gilled tube radiator; lubrication is assured by a pump driven off the rear of the camshaft, the flow being through a sight feed on the dashboard. Engine control is entirely by-pedal, there being no levers on the steering wheel. Cone clutch is provided; there are three sliding speeds and reverse and final drive by cardan shaft. Rear suspension is by three-quarter elliptics.

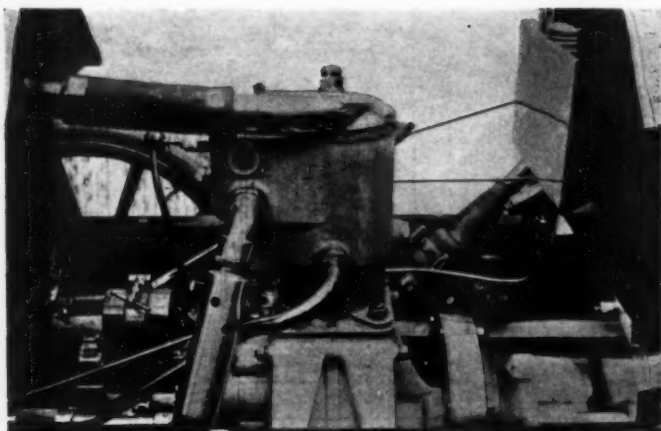
The Very Original Little Bayard-Clement.

Bayard-Clement had one of the smallest and most original of four-cylinder cars, the cylinder measurements being only 65 by 100 bore and stroke (2.5 by 3.9). The four cylinders and engine base, together with exhaust and intake manifold, were a single casting, the crankshaft naturally being attached to upper portion, for no lower casting existed, and the oil pan being formed by a sheet metal casing band drawn tight by a single screw and nut. Valves were all on one side with spark plugs immediately over the inlet valves and magneto at the front of the engine. The mounting of the engine was somewhat original, there being a couple of radiating arms both front and rear, each one terminating in an eye hole, through which passed a steel tube with suitable flattened ends to allow of it being bolted to the side members of the frame. Cooling was by thermo-syphon with a special type of radiator consisting of about forty flat copper tubes uniting an upper and lower tank. The thin end of the tube was presented forward, and, in order to break up the current of air they were faced by a metal grating, giving the car the appearance of having a cellular radiator.

The same firm produced for the first time a single cylinder car pistons per cylinder, the combustion chamber being between metal base to the crankchamber. In both cases sliding gear



Harmonious Arrangement of the Display of Berliets.



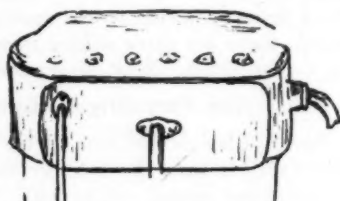
Corre One-Cylinder that Attracted Much Attention.

transmission of the straight through type was employed and final drive was by propeller shaft.

Motobloc showed the only single-cylinder engine with gear-box and crankcase in a single unit, the engine and transmission forming a single block, as on the larger cars by the same firm.



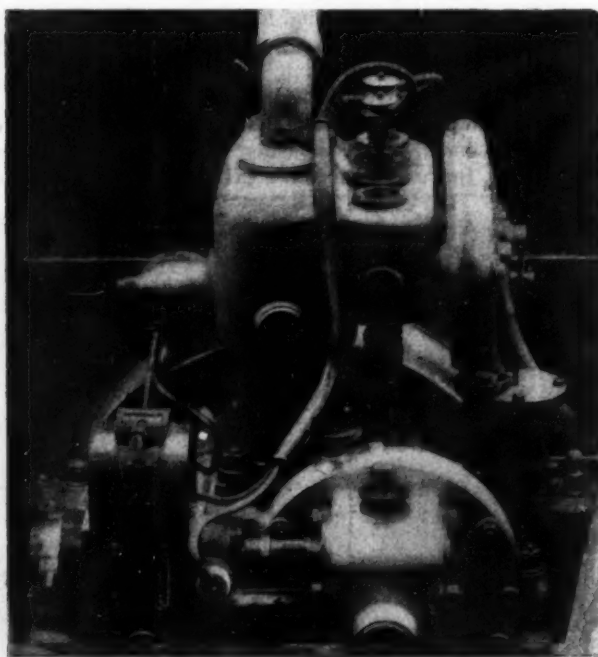
Top of Carburetor and Intake Pipe of Berlet.



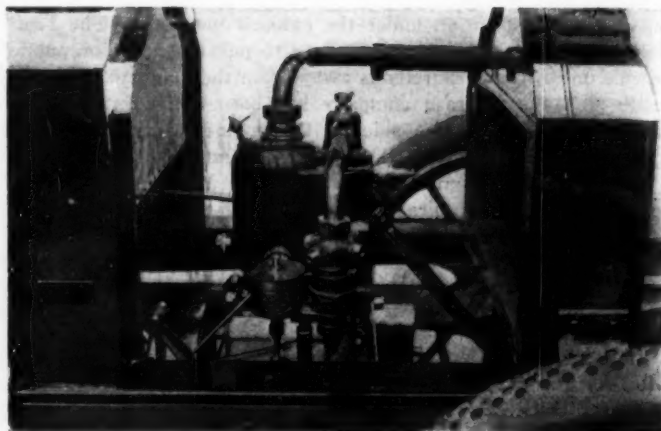
Enclosed Valves and Piping on Delahaye.

A feature of the little car was the mounting of the honeycomb radiator in hinged bearings—with suitable oil-caps attached to prevent the straining of the tubes on a twisting of the frame.

In dealing with the voitures one enters to a certain extent the realm of the assembled car, for many of the firms in this class have not the resources necessary for producing an entire vehicle. In the majority of cases a De Dion or an Aster single-cylinder engine with high-tension magneto and thermo-syphon



Power Plant of the New Renault Taxicab.

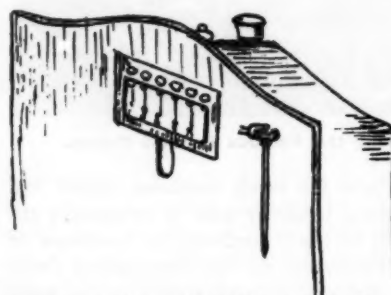


Another One-Cylinder French Car—The Truffault.

water circulation was employed. Such firms as Sizaire-Naudin and Chenard-Walcker produced a vehicle entirely of their own manufacturer. There is a disinclination on the part of all the voiturette builders to reduce the size of the bonnet in proportion to the size of the engine it covers with the result that there is a considerable amount of waste space. In several cases the unoccupied area between the front of the dashboard and the engine is taken advantage of to house the gasoline oil and water tank, and in one case to provide a chest for the most commonly used tools.

Air Cooling a Novelty in France.

The Henriot's company's stand supplied more of the distinct departures from standard design than any in the show. Among the novelties were a couple of air-cooled engines, each provided with a couple of fans on the valve side of the engine, driven in one case by bevel gear and upright spindle from the camshaft, and the other by belts from a pulley operated by means of bevel gear off the crankshaft. The single pulley, with a double-grooved face connected up by means of belts to transverse shafts, pass-



Renault Dashboard with Flush Sight Feed and Filler Cap.



Automatic Belt Tightener on Dietrich.

ing respectively between the first and second and third and fourth cylinders, the fan being attached to the opposite end of the shaft. A planetary transmission contained within the fly-wheel was attached to the same car. On the same stand was a four-cylinder water-cooled engine without radiator. On the front of the dashboard was a large water tank, through which the cooling water flowed by thermo-syphon circulation. An air pump, driven off the rear end of the camshaft, was connected up by suitable piping to the point at which the cold water entered the cylinders, and there discharged its jet of cold air, cooling the water and at the same time driving it into the jackets.

Knight Engine Not So Interesting to the French.

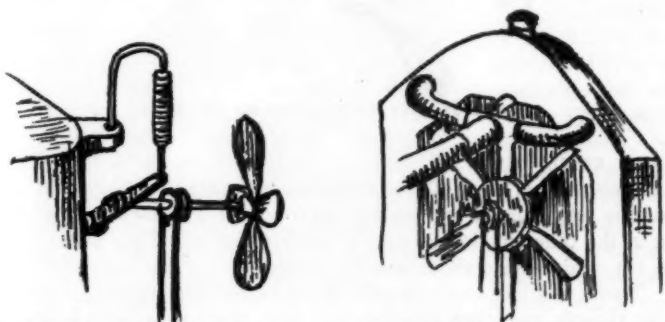
Knight's patent did not attract the same amount of attention here as at London, the Frenchmen evidently having less faith in its ultimate adoption than the Britishers. Minerva exhibited one

of these models, constructed in their Belgian factory, and the other was shown by Gem on a gasoline electric chassis, the motor being obtained from the English Daimler Company. Gasoline electric firms at the show were but two in number, the Gem and the V. A. T. E., the latter showing small cars with a single and two-cylinder engine driving a dynamo. Steam had not a single representative in the big hall.

Aeronautical Influence Shown.

There was evidence that a large amount of serious work is being undertaken by European constructors toward the development of a light-weight engine for aeronautical work. The new Renault and the seven-cylinder Bayard-Clement were not shown, but will doubtless be brought forward for the second Salon, devoted to commercial vehicles and aerial navigation. Gobron displayed one of the most interesting of the light-weight engines with an eight-cylinder sixteen-piston developing 80-horsepower at 1,500 revolutions and weighing complete, with two magnetos, 460 pounds.

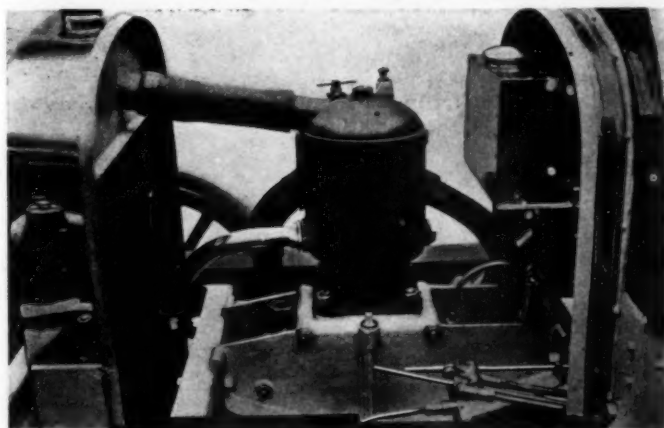
The cylinders form an X, each pair being placed in relation to its neighbor at an angle of 90 degrees. A two-throw crank-



Automatic Belt Tightener on the Gem.

Arrangement of Water Pipes on Berliet.

shaft is employed, to one pin of which are connected up the eight pistons per cylinder, the combustion chamber being between the two. It is a principle that has been adopted to the maker's cars for years with very satisfactory results, the engine being regarded now as nothing more than a long stroke one. The cylinders are water cooled, circulation being assured by a pump working off the crankshaft and the water flowing through copper jackets surrounding the cylinders. Inlet valves are automatic, the exhaust mechanically operated by means of an oscillating arm for each pair of cylinders, there being no gears whatever for the valve mechanism. There are two magnetos, each one feeding four cylinders. This arrangement has been adopted in order to avoid the high speed which would be necessary for a single magneto supplying the eight cylinders of an engine revolving at 1,500 revolutions a minute and also as a measure of security. Should one magneto fail the engine could still run on the



The One-Cylinder Motor as Shown on the Simphon.

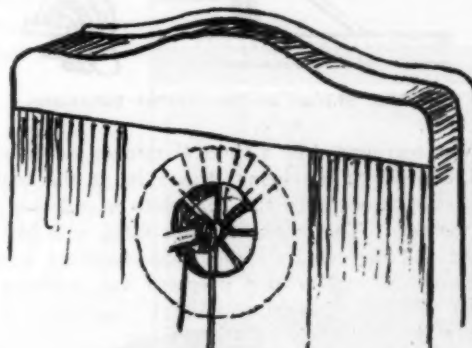


Darracq Method of Carrying Pet Dogs in Auto.

other with four cylinders sufficiently long to allow the aeroplane to be brought safely to earth. Lubrication, usually a difficult matter on engines of this type, is obtained by means of a pump on the outside of the engine feeding oil at the heads of the cylinders that are uppermost. The oil runs down to the base of the opposite cylinders, is there collected and again driven to the top. The carburetor is of the ordinary type.

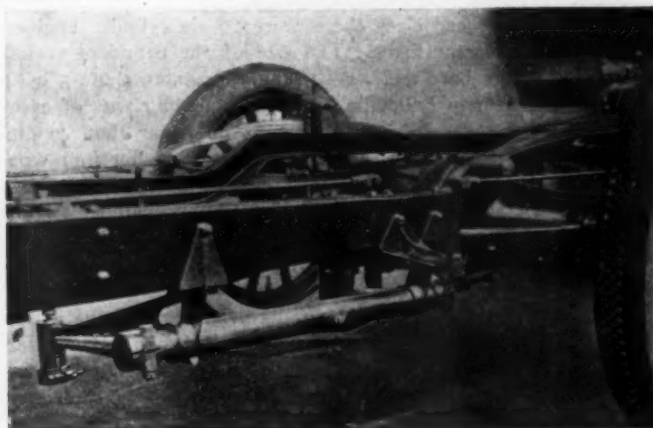
And Now Another Rotary Engine.

A light-weight rotary engine was shown by the Gnome company. The engine, which was constructed entirely of nickel



Charron Dashboard Radiator with Fan in Center.

steel, has four cylinders placed at equal intervals round a circular crankcase, fitted with radiating flanges and revolving round a fixed crankshaft, cooling being assured by their passage through the air. The crankshaft was hollow, carburetion

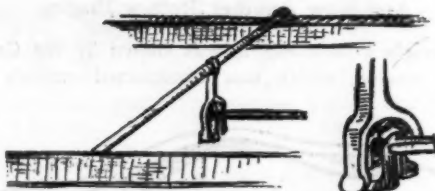


A New Type of Torsion Rod with Ball Socket Joint.

Carburetor and Intake
on Charron.Broadened Axle at Spring Seat
of a Fiat.

being through its center, and exhaust through mechanically operated valves in the cylinder heads. High-tension ignition was employed with a Bosch magneto.

Pipe, the Belgian firm, presented an eight-cylinder air-cooled engine of 3.9 bore and stroke, declared to develop 70 horsepower, and weighing complete 286 pounds. The mechanically operated valves were placed in the cylinder head and operated by overhead rocker arms from a single camshaft. Each valve performed both the functions of inlet and exhaust, the first position of the valve opening the inlet, the second position closing it by means of a sliding sleeve and opening the exhaust. Each line of



Gear Shifter on the Rochet-Schnelder.

cylinders was surrounded by a sheet aluminum jacket with a bell bottom, a current of air being drawn in at the base of the cylinder passing upward to the head into a collector and outletting at the rear. The crankshaft was fitted with ball bearings at each end and the center; combustion chambers were hemispheric, ignition by high-tension magneto and ordinary type of



Distance Road and Spring on Same Hanger on Delahaye.

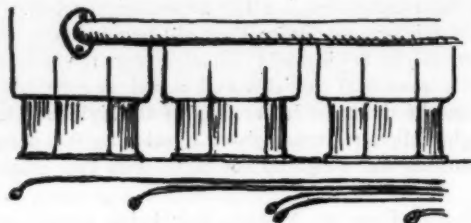
carburetor carried in the angle formed by the two lines of cylinders.

In the complete car class there were 66 six-cylinder engines shown by 38 different firms. The size of the cylinders varied from 5 1-2 inches bore and stroke on the Itala, to a 2 4-5 by 4 inches on a Delaunay Belleville. The most popular way of casting the cylinders was in groups of two, no fewer than 49 out of the 66 being designed in this way. There were but four with two groups of three cylinders and 12 with the cylinders cast separately. Delaunay Belleville had the only six-cylinder engine in a single casting. An interesting feature on the new Panhard was that though the cylinders were cast separately they were bolted up in such a way that they formed one group, the jacket of each cylinder slotting into that of its neighbor, and the whole being linked together by four bars passing through the water jackets longitudinally. This gave the advantage of six separate cylinders with the reduced area and absence of water piping of a single casting.

In a large number of cases it had been possible to put a group

of six cylinders under the same sized bonnet as for an equal powdered car with four cylinders, manufacturers having sought, in a number of cases, to reduce the over-all length to a minimum. There were a few examples of very elongated bonnets, and in one case, the Mors, the rear cylinder had been carried under the footboard to gain space.

The popularity of high-tension magneto was fully demonstrated on the six-cylinder models, where of the 66 cars exposed 54 had high-tension and only 12 low-tension ignition. These latter comprised in all cases the most powerful cars and were presented by Mors, Mercedes, Itala, Brasier and Bollee. The



Method of Attaching Oil Heads on Bollee.

most general order of firing the cylinders on the six-cylinder models was 1 5 3 6 2 4, which was the method adopted on 41 of the total number of engines; in 9 cases the order was 1 3 5 6 4 2, the other methods being 1 4 2 6 3 5, 1 2 3 6 5 4 and 1 2 4 6 5 3, which were about equally divided.

There was but one example of an eight-cylinder engine on a car chassis, and even this one had been first designed for aeroplane work and slightly strengthened for automobile service. The cylinders, of 110 by 120 bore and stroke, had copper jackets electrically welded on by a new process. Valves were all in pockets on one side of the engine, operated by a single camshaft and carburation and ignition followed standard lines. A distinctive feature was a variation of the timing by the sliding of the camshaft in its bearings at the will of the driver.

COMPONENTS SHOWN AT THE PARIS SALON.

Generally speaking, and this was probably on account of the plentitude of space in the galleries of the Salon, the components had a large department to themselves. Motors, frames, axles, gears, etc., made large displays, and the selection of tools was very extensive. This was a minor feature of the show, and the smaller road tools in particular were extraordinarily varied and compact.



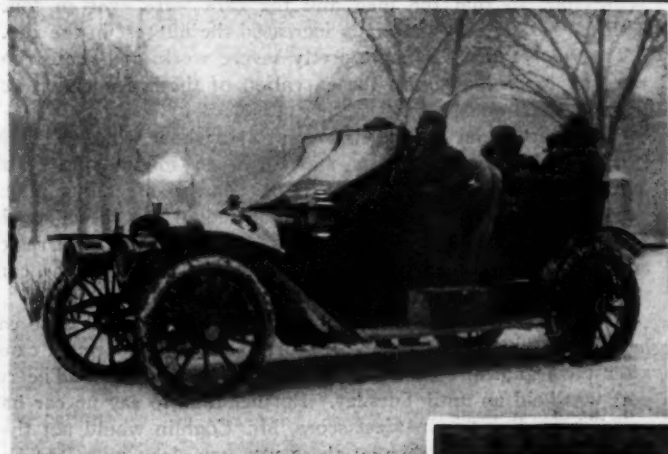
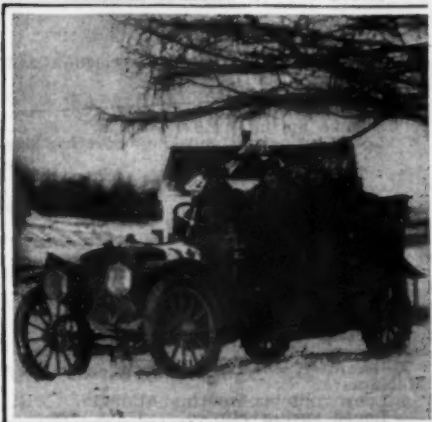
President Faillieres inspecting the Salon Exhibits.



WORCESTER, Mass., Dec. 16.—An air-cooled Franklin, capably driven by C. S. Carris, evolved as the single winner of the 210-mile endurance and reliability run of the Worcester Automobile Club, held in and around Worcester county, Saturday, December 12. Fourteen cars started, of which two-thirds evolved with perfect road scores, but the Franklin was the only one surviving a searching examination of two hours on the part of the technical committee, which was finally forced to give up the task without even finding a screw or nut loose that would call for the slightest of penalties.

Carris, well known as a transcontinentalist, is a careful and experienced driver, and made no attempt to "burn up" the country roads, satisfying himself with getting into controls comfortably according to schedule. He has secured perfect Franklin scores in five endurance runs during the past season, including the annual A. A. A. tour for the Glidden trophy.

Second and tied in the honor roll are a Rambler, driven by B. A. Robinson, and a Cadillac, driven by H. J. Murch, both of which only suffered two points in penalization. Third is an American



roadster, with five points charged; fourth, a Knox touring car, with six points away from perfection, and fifth is a Lozier runabout, with seven points loss.

Herewith is the official standing of the contestants examined:

1—Franklin, entered by Worcester Motor Car Co., Worcester; driver, C. S. Carris.

2—Rambler, entered by B. A. Robinson, Boston; driver, B. A. Robinson.
Loose petcock on pump..... 1
Loose pin on spark control..... 1
Total 2

3—Cadillac, entered by Murch & Hilden, Worcester; driver, H. J. Murch.
Loose terminal on dash..... 1
Loose bolt on rear end tie rod between radiator and dash. 1
Total 2

4—American Roadster, entered by American Car Co., New York; driver, D. F. Lloyd.
Bolt gone on engine pan..... 1
Nut loose on throttle bolt..... 1
Loose bolt in hood frame..... 1
Loose stuffing box on pump..... 1
Loose cup on steering knuckle..... 1
Total 5

5—Knox Touring, entered by Knox Automobile Co., Springfield; driver, Albert E. Dennison.
Loose nut on engine pan..... 1
2 loose spring clips..... 2
2 loose spring nuts..... 2
Loose adjusting collar on steering post..... 1
Total 6

6—Lozier Runabout, entered by Franklin Square Garage; driver, H. H. Cobe.
Loose screw in floor plate steering wheel..... 1
3 loose nuts in ignition coll..... 3
1 lost nut in ignition coll..... 1
Loose control head..... 1
Loose hose connection..... 1
Total 7

7—Premier, entered by Premier Depot Co., Boston; driver, Ray McNamara.
Loose nut on steering knuckle..... 15
Loose spring clip..... 1
Loose dash bolt..... 1
Small leak in radiator..... 5
Total 22

8—Berkshire, entered by Berkshire Motor Co., Pittsfield; driver, E. B. Belcher.
Loose radiator..... 4
Bolt lost from crank case cover..... 1
Bolt loose on crank case cover..... 1
3 loose spring clips..... 3
2 loose spring bolts..... 2
Packing gone from exhaust..... 1
Loose bolt on exhaust..... 1
Three men two minutes labor..... 12
Total 25

9—Studebaker, entered by Franklin Garage, Worcester; driver, J. Oswald.
Loose left mud guard..... 2
Left spring link upside down..... 5
2 loose bolts in left running board brace..... 2
3 engine frame bolts loose..... 3
Loose engine pan bolt..... 1
Loose steering gear joint..... 7½
3 spokes in rear wheel broken..... 15
Motor stopped 5 minutes..... 10
8½ minutes late at control..... 9
Total 54½

10—Lozier Touring, entered by H. C. & C. D. Castle, Boston; driver, E. F. Wilson.
10 spokes broken in left rear wheel..... 50
Loose nut on right spring clip..... 1
3 loose oil connections..... 3
3 loose nuts on coil box..... 3
Loose spring clip on rear spring..... 1
Loose terminal on magneto..... 1
2 loose spring clips..... 2
Loose left front bearing..... 1
Total 62

The examination was conducted Sunday at the Pilot garage, the cars having been in charge of a deputy sheriff over night. It required practically the entire day for the committee to complete its work. President J. P. Coghlin announced that it would not be until Tuesday before Referee A. E. Bliss, of Waltham, would be able to announce the official standing of the cars. The examination was one of the most thorough that has ever been made of cars in any contest in this country, and the committee was capable of doing its work with all fair-

ness to every contestant, as not one of them was in any way connected with the trade, all being members of the staff of professors at the noted Worcester Polytechnic Institute.

The contest, as a whole, was one of the most exacting that could possibly have been planned. The cars and men were submitted to the severest of tests. That eight cars, more than half the starters should have come through with perfect road scores, speaks volumes in itself for motor car construction.

The six cars which failed to finish with perfect road scores suffered from accidents, in the main, and from other slight things which did not affect their structural features. For instance, the Studebaker car was penalized for being late at one of the controls simply because its operators had neglected to take the precaution to fill up the gasoline tank. The Berkshire operator forgot himself for a moment, when arriving at the city control upon the completion of the first run, and shut off his engine, thereby causing a penalty.

E. P. Blake, in the Jackson, smashed an axle owing to the slippery condition of the road, which caused his car to skid and make three complete revolutions, finally butting up against a woodpile and throwing out the four occupants, none of whom was injured.

Bourque, in the same Knox sportabout he drove in the Vanderbilt race, came to grief in Tatnuck. The American car ahead of him traveling at a great rate of speed began to skid, and Bourque, following closely behind, was in imminent danger of colliding. There was nothing for it, so he drove into a ditch at the risk of his life and the men with him, and broke the valve stem on his car. He withdrew rather than stand for 60 points penalization that making the repair would entail.

Dennison, also driving a Knox, had a close call on the fifth round. There was no way of seeing whether or not a train was coming in either direction at a grade crossing in Colebrook, and there was no flagman on the crossing. He was speeding along with three passengers and covered the crossing just a fraction of a second ahead of a fast express, which whizzed into sight and over the crossing.

Williams, in the Rambler, was unfortunate enough to have a key on one of the rear wheels shear off between Princeton and Quinapoxet and leave him helpless six miles from a telephone. He retired from the contest.

The White steamer, which had traveled some 20,000 miles this last season, and which up to the last control of the day, had been performing exceptionally well, met with slight difficulties and was penalized accordingly. The only other car to have double penalties was the Berkshire, which had to be pushed up a hill by the passengers on the last control of the day.

The contest started in a rain and snowstorm at 6 o'clock in the morning, which continued until noon. Then the sun came out, and the afternoon runs were truly enjoyable. The contest finished in darkness, about 6 o'clock. The contest was split up into five runs, each of about 20 miles out and 20 miles in. The snow of the day before made the going particularly hard out in the country. The starting and ending point for each control was in Worcester, so that the men and the cars were ever in touch with the base. This materially increased the interest in the run.

The rules called for some pretty severe work, and these rules were all carried out with the exception of the brake clutch and transmission tests.

Cobe started out on the first control to show what speed his Lozier had, and the others started in to follow suit. This quickly resulted in Police Chief D. A. Matthews sending a sergeant to notify President Coghlin that should the speed law be violated after the second control all drivers would be arrested and taken out of the contest. There were no arrests, the contestants slowing down while within the confines of the city.

President Coghlin Sunday night said he could state that no car had come through with a perfect score. This announcement came after the technical committee had handed in its report. The report was held up until Tuesday. Further than to say no car had come through with a perfect score, Mr. Coghlin would not then speak. Later he learned that there was one clean score car.

AUTOMOBILE MOTOR CRANKSHAFTS DISCUSSED

By THOS. J. FAY, PRESIDENT SOCIETY OF AUTOMOBILE ENGINEERS.

IN the discussion of this subject the idea will be to favor the class of materials:

- (a) susceptibility of die (drop) forging;
- (b) easily fashioned;
- (c) affording excellent bearing surfaces;
- (d) of great rigidity;
- (e) with notable kinetic ability;
- (f) not impossible to procure;
- (g) cost of the materials to be moderate.

It will not be considered proper, however, to assume that the materials as above outlined will be those of the common pres-

ent practice since it cannot be shown that the common materials of the time are possessed of (d) great rigidity and (e) notable kinetic ability. This is not to say that the common crankshaft materials are without value for the purpose. The very service they render is an assurance of quality not to be attached to ordinary grades of steel. However good the run of steel may be, that is the steel advocated and used for crankshafts, the fact remains that there are a great many failures in the course of a year. Strange as it may seem the failures are not confined to low-priced steel; price alone does not seem to be the matter of moment.

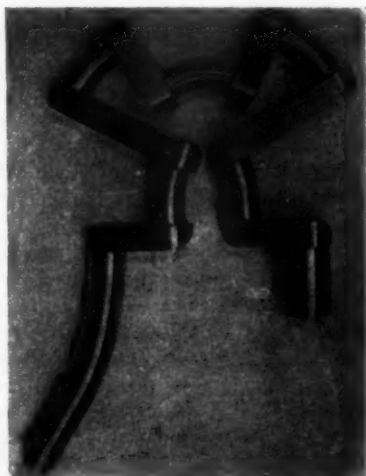
It is a monstrous iniquity to pay \$150 for a crankshaft that will last no longer than a \$30 member of the same order; this is not uncommon, and it leads one to believe that the \$30 kind is, after all, the better of the two. Were a person to reach a conclusion as the result of noting one, two, or, ten failures of this description, 'twould be hasty; unfortunately, the number of such instances to be seen at every hand are too numerous.

The Two Points of View.

At all events there are two prime points of view of the crankshaft in the light of modern knowledge, i. e.:

(a) That involving the use of material so high in kinetic ability as to afford a long life even though the stresses result in deflections likely to end in disaster under the conditions involving the ordinary, or, even good grades of crankshaft steel. (b) The idea of materials so rigid in their initial status as to limit deflections under the most severe conditions to the purely nominal.

The first product, then, would be most pronounced in its kinetic ability, while the second product would be ambitious from the point of view of initial rigidity. This statement will be plain if we conceive of steel of a description such as will resist deformation to the maximum before deflecting, say, quenched tool steel, as compared with soft Swedish iron. These statements are not intended to convey the idea that the presence of pronounced kinetic ability would render it unnecessary to realize in the same steel a good showing of rigidity as well, nor would it be desirable to use extremely rigid steel in which kinetic qualities would be absent. The idea to be conveyed is one, taking into account rigid steel with kinetic ability as a secondary consideration, on the one hand, and highly kinetic steel with rigidity as a secondary consideration on the other hand.



Austrian Alloy Steel, After Undergoing Bending Test.

To advance the theme a pace, the deflections resultant of service, considering a given extreme fiber strain, will not be of the same extent for all grades of steel, even though the unit stresses may be relatively the same, or, if the unit stresses are the same percentage of the elastic limit in the respective cases. For a given extreme fiber strain, then, the deflections may be more or less dependent upon the physical characteristics of the materials; to illustrate this point by resort to an example, which for clearness may involve the torsional shear, and the elastic resistance to torsion. To begin with, the polar moment of inertia is independent of the grade of the material, because the polar moment is equal to:

$$J = \frac{\pi d^4}{32} = \text{the polar moment of inertia;}$$

in which,

d = the diameter of the torsional member in inches.

For a 1-inch test piece, then, the polar moment of inertia would be of value as follows,

$$J = \frac{3.1416 \times 1^4}{32} = \frac{3.1416}{32} = 0.0981 =$$

the polar moment of inertia of a round section of the diameter given.

If the polar moment of inertia is a mere matter of dimensions rather than involving the qualities of the materials used, it follows that the differences to be elucidated must be on account of the qualities residing in the materials in such a way that the several materials can be compared using the one size, thus rendering the proof a comparatively simple matter.

Chrome Nickel and Carbon Steels Compared.

In further relation to this matter it is necessary to select the materials to be compared, having in mind the fact that they should be crankshaft materials, so fabricated as to lend stability to the class of work under discussion in a fitting manner.

CHROME NICKEL STEEL.

Physical Properties:

Tensile strength in pounds per square inch.....	150,000
Elastic limit in pounds per square inch.....	130,000
Elongation, per cent in 2 inches.....	12.
Reduction of area, per cent.....	33.

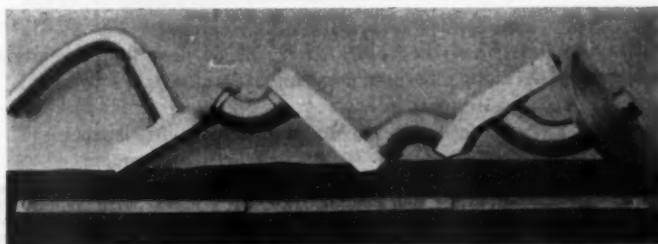
CARBON CRANKSHAFT STEEL.

Physical Properties:

Tensile strength in pounds per square inch.....	80,000
Elastic limit in pounds per square inch.....	40,000
Elongation, per cent in 2 inches.....	18.
Reduction of area, per cent.....	36.

Taking these representatives of crankshaft materials as showing good in their respective genera, proceed thus:

On a basis of 50 per cent of the elastic limit as the extreme

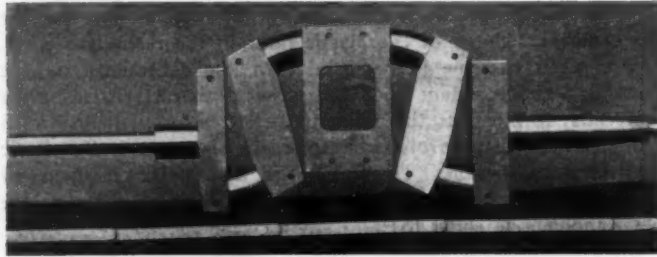


Heat Treated French Alloy Steel After Bending Test.

fiber strain in each case, and representing the same by the letter S , we have:

$S = 65,000$ for the chrome nickel steel;
 $S = 20,000$ for the carbon steel.

The diameter being the same for both materials, viz., 1 inch, the value of c may be taken as $\frac{1}{2} \times d = 0.5$ inch, and with these



Balanced Two-Bearing Crankshaft After Test.

data it will be possible to fix upon the twisting moment in each case as follows:

Chrome nickel steel:

$$Pa = \frac{SJ}{c} = \frac{65,000 \times 0.0981}{0.5} = 12,753.$$

Carbon steel:

$$Pa = \frac{SJ}{c} = \frac{20,000 \times 0.0981}{0.5} = 3,924.$$

In the two cases we have the twisting moments that would follow were the two specimens stressed to the same percentage of the elastic limits of the respective specimens. It is not possible to stop here if anything is to be shown, since the results of these twisting moments were not disclosed. If we investigate the elastic resistance to torsion it is possible the consequences of the applications will be disclosed. Considering the elastic resistance to torsion it is necessary to assign a length to the specimens. Let us assume that the specimens will have a free length of 12 inches, and that the angle due to the torsions will suffice for the purpose.

We have, then,

l = length of proof = 12 inches.

d = diameter = 1 inch.

P = applied force in pounds at the distance a from the axis.
 Pa = the torsional moment. Given before for each case.

θ = angle through which the free end of the specimen is twisted, measured in arc of radius = l , or unity.

$*G$ = torsional modulus of elasticity, taken as $\frac{2}{5} E$, in which E = modulus of elasticity in tension.

Numerical Examples.

$$\theta = \frac{32 \times Pa l}{\pi d^4 G} = \text{torsional angle measured in arc of radius} = l$$

For chrome nickel steel:

$$\theta = \frac{32 \times 12,753 \times 12}{3.1416 \times 1^4 \times 12,000,000} = 0.1299$$

For carbon steel:

$$\theta = \frac{32 \times 3,924 \times 12}{3.1416 \times 1^4 \times 12,000,000} = 0.0399.$$

Having thus fixed the values of θ , let us now find the angle of torsion α (alpha) for the respective specimens as follows:

$$\alpha = \frac{180 \times \theta}{\pi} = \text{angle of torsion in degrees.}$$

*The modulus of elasticity for tension has been assigned values ranging between 27,000,000 and 32,000,000 for steel, with 30,000,000 as a close approximation. The modulus of elasticity is regarded by the majority of steel men as the same for chrome nickel steel as it is for carbon steel; there is some doubt about this, but the proof of a difference is not at hand.

For chrome nickel steel:

$$\alpha = \frac{180 \times 0.1299}{3.1416} = 7^\circ 26'$$

For carbon steel:

$$\alpha = \frac{180 \times 0.0399}{3.1416} = 2^\circ 17'$$

What do we find? Probably what most of us failed to look for, in our endeavors to discriminate between the suitable products and those to be avoided. At all events, it is plain that the actual deflection in degrees of arc, considering a given percentage of the elastic limit of the respective materials, is greater as the quality of material is increased, if it is true that increasing the elastic limit of the material increases the quality, which it does, from certain viewpoints at any rate.

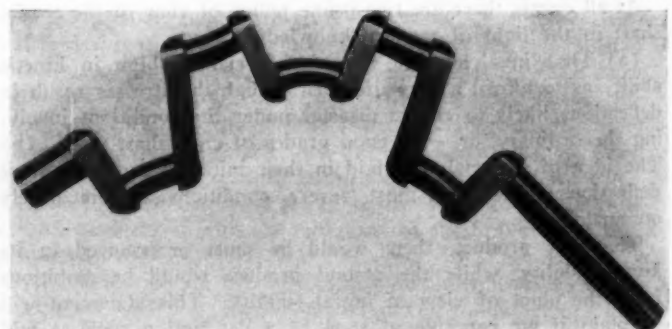
The actual deflection in degrees of arc was found to be (in a foot of length) seven degrees twenty-six and four-tenths minutes for the chrome nickel steel and only two degrees seven-tenths minutes in the case of carbon steel. To glance at the formulæ is but to discover that this is all that can happen if it be true that the modulus of elasticity is the same for both genera of steel, because, with proofs of the same dimensions, and the same percentage of elastic limit, what have we but a diminished deflection in the case of the steel for which the Pa value is the minimum?

If, on the other hand, the extreme fiber strain were taken the same for the different products, then the deflection would be the same in both cases. This is to say, the high-priced material would have to be used in the same profusion as the material costing considerably less money per pound to purchase, and a great deal more to fashion into the desired shape. If it is not feasible to take advantage of the increased elastic limit of material, because by doing so the torsional angle will increase, elastic limit over and above the needs would scarcely be a desirable commodity to pay anything extra for. So far, then, the discussion has led to a very unsatisfactory state of affairs with the idea uppermost that investigation would be profitable.

Let us add to the confusion by making the bald statement that there has in the past been a crop of crankshaft failures of the class using the finer grades of alloy steel; let it be understood, too, that the inferior carbon steel products are well represented in the land of failures. What does it portray?

Deflection Proportional to Fiber Strain

We can begin by saying that if the modulus of elasticity is no better for alloy steel than it is for carbon steel, the deflection will be proportional to the extreme fiber strain, and the increased elastic limit of the one will be of no aid, providing it can be

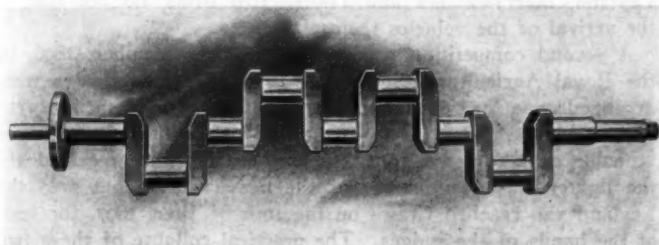


A Chrome Nickel Steel Crankshaft Tested Out.

said that it is the deflection magnitude that must be limited. It is desirable to investigate the several grades of steel and ascertain for sure if the modulus of elasticity is the same for all, or substantially so. Then, again, it would be desirable to know if deflection magnitude is the real measure of life, or can we say the deflection is a matter of no moment if the extreme fiber strain does not exceed a certain percentage of the actual elastic limit of the material used in any given case?

In the design of crankshafts, if deflection is the matter of moment, it is only necessary to remember that the deflection, under constant conditions, is inversely proportional to the fourth power of the diameter of the shaft; the formula may be written:

$$\alpha = \frac{180 \times 32 \times Pa \times l}{\pi^3 \times d^4 \times G} = \text{angle of torsion in degrees.}$$



A Good Example of Current American Practice.

This is to say, it would require but a very slight increase in the diameter of a member to reduce the torsion angle a very considerable amount. At all events, it is possible to explode a theory so oftentimes cited by designers of even "national" reputation, who are fond of saying, "If a crankshaft is made of very strong material it will not deflect and the tendency to deteriorate will not even exist." What they mean to say is: no distortion, no deterioration. That it is their custom to use less of the high-priced material than they would of low-priced material, is an assured fact. Under such conditions as has been here shown they have deflections of considerable magnitude in excess of the deflections that will actually obtain in the cases of the inferior steel of a somewhat greater (or even the same) section. It may seem odd to say that the rigid, high-priced material is likely to deflect more than the comparatively weak, and, in a sense, inferior steel, but is it really so wonderful? How about spring steel? Is it not far better than steel castings? Who will say that a steel casting will so readily deflect as will spring steel?

The steel casting can be of exactly the same composition as the spring steel; what is the real difference? In the mode of fabrication, of course. As steel castings go, 'tis a fair statement to say, the composition that produces a sound casting of excellent quality, would result in a good spring; changing the mode of fabrication to suit.

In other words, good material makes good castings, or, good springs. The process must suit the ultimate ends in each case, which is another way for saying, crankshafts to be good, must be of the raw materials good for the purpose, suitably fabricated.

In a spring, we want high carbon, but, since a crankshaft is, to be sure, the reverse of a spring, do we want high carbon? Probably not; do we want low carbon? Very likely; why?

In the first instance, the absence of carbon renders the steel easy to work and difficult to injure during its manipulation. Certainly these are good points; they are not all.

The kinetic ability of steel is of the greatest importance if the steel is to be used for crankshafts, if it is true that the deflections may not be aborted. It is a moral certainty that the deflections do abound, irrespective of the grade of steel used in the count as herein before stated and for other reasons besides.

Low Carbon Content Desirable.

With the carbon content below, say, 16 points, it is quite out of the question to consider that the steel will be difficult to manipulate because of the carbon content. True, it would be desirable to depress the carbon content even more under certain conditions. That is to say, if the steel is alloyed, and the physical properties are buoyed up to the desired point without the aid of carbon, or, without having to consider the tendencies of the carbon content, the lower the carbon in the steel the better it will be from the kinetic point of view. If the deflections cannot be eliminated, the greater the kinetic ability, the longer will the crankshaft serve for the purpose, which is no license to in-

crease the extreme fiber strain to any extent at all, even if the steel used has a high value of the elastic limit.

A Swedish iron crankshaft, in which the carbon might run as low as five points, would scarcely work in a manner satisfactory, primarily because the modulus of elasticity is considerably lower than that which should obtain, with the result that the section would have to be increased to a point beyond that possible in nine cases out of ten. If the section could be increased, the iron shaft might be the peer of them all. It is not necessary either to employ steel high in carbon, or iron so low in carbon as to affect the modulus of elasticity (if it is the absence of carbon in the iron that does account for the lowered modulus), since it is possible to so alloy steel as to render the same of considerable strength even though the carbon content may be under ten points, as it is in some of the finer grades of "cementing" nickel steel, and in some grades of alloy steel as used in crankshaft work, of the best examples.

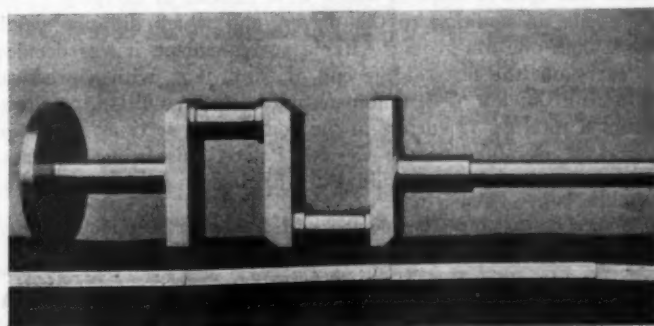
The dynamic life of steel is limited, of that there is now no question at all. Instead of the life as inversely proportional to the extreme fiber strain, the same life decreases much more rapidly. Under the circumstances it is a fallacy to fix the extreme fiber strain at a high level.

If a crankshaft would last forever were it large enough to resist all deformation tendencies, it would be too large to use, for the reason that the rest of the car would fail to last so long. On the other hand, if the metal of such a shaft were to show a value of, say, 1,500,000 alternate shocks under a stress of one-half the elastic limit, to so design the shaft as to have it work at that stress would assuredly be bad practice, since the death of the shaft would be too much to keep continuously in the mind's eye.

The Extreme Fiber Strain Should Be Low.

By designing such a shaft, so that the extreme fiber strain would be one-tenth instead of one-half of the elastic limit, the death of the shaft would be a remote contingency. The shaft would be one of the parts to fail last of all in a car; in view of its cost, and the damage done by a failing shaft, to make it the least likely to fail in service is to be right. In quest of high kinetic ability, which seems to be of the greatest importance, it is more than high elastic limit that is desired. If we say the utility of a product for the purpose depends upon the relations of the physical properties, we may be more or less right, since by so manipulating steel as to alter the relations of the physical properties we are able to increase or decrease the kinetic properties at will.

Obviously "burnt" steel stands the lowest in the scale of kinetic ability. The next in order is quenched steel. It will be observed



Balanced Double Opposed Crankshaft.

that as the elongation decreases the kinetic ability decreases; in what ratio, the author is not at the moment prepared to state. The elastic limit can hold at a constant value for two specimens to be compared, and the one of the two having the greatest elongation will be the one with the greatest kinetic ability. In this may be seen the great desirability of the maintenance of high elongation.

(To be continued.)

TWELVE YEARS' PROGRESS IN COMMERCIAL VEHICLES*

By E. SHRAPNELL SMITH, TREASURER OF THE COMMERCIAL MOTOR USERS' ASSOCIATION.

THERE were, 12 years ago, no commercial motors in existence. The range of to-night's paper may, therefore, embrace every stage of evolution, and numerous instances of misapplication. One is reminded by the presence in the chair of Sir David Salomons, Bart., of the interesting demonstration which he organized 13 years ago, at Tunbridge Wells, on the 15th of October, 1895, when the De Dion-Bouton steam tractor presented for the first time the embryonic details of a system which might well have been more successfully developed for commercial purposes. One year later, on the 26th of October, 1896, Sir David inaugurated the North of England branch of the Self-Propelled Traffic Association by the delivery of an address at the Liverpool Royal Institution. On that occasion he was unable to indicate a single vehicle for utility purposes, which fact is now quoted in confirmation of the opening sentence of this paper. Liverpool merchants and shipowners in September and October, 1896, were particularly anxious to obtain information about the prospects of this branch of motoring, but neither Mr. Sennett, who read a paper before the British Association meeting, nor Worby Beaumont, who addressed the Incorporated Chamber of Commerce, was able to adduce one example of practical application. Mr. Beaumont concluded his address with this statement: "Great as the promises are of motor vehicles for light work, I am satisfied that the commercial motor vehicle for heavy traffic has yet to be designed." A year later, when Mr. Beaumont, on the 26th of November, 1897, opened the second session at the Liverpool Royal Institution, he was able to describe early Coulthard, Leyland and Thornycroft vehicles, a petroleum spirit lorry by the Anglo-French Company, and a Serpollet type lorry which had been constructed by Messrs. Samuelson, of Banbury; he also spoke highly of the Scotte and De Dion-Bouton vehicles of 1897; yet there was meager evidence of advance.

The situation 11 years ago was, accordingly, one of non-application, but there had been efforts to encourage the construction of self-propelled vehicles of all kinds. The principal of these was essayed by the proprietors of the *Engineer*, which announced, on the 5th of July, 1895, an 1,100-guinea competition for motors of all classes. Two of the classes, in respect of which prizes (value £400) were offered, were open to commercial vehicles. One of these was for a vehicle which should be capable of carrying not more than one ton of goods, in addition to the driver, and of which the gross weight should not exceed two tons; the other was open to vehicles which were capable of carrying 5 cwt. of goods, in addition to the driver, and which did not weigh more than one ton gross. After a postponement, it was decided to carry out the tests at the end of May, 1897, with a practical run from London to Birmingham and back, in addition to others. From a total of 17 entries in the commercial sections, only one van was presented at the Crystal Palace, this being a steam-driven vehicle by the Liquid Fuel Engineering Company, Lim-

ited, of East Cowes. The entries by the Clarkson, Coulthard, Leyland, Merryweather and Thornycroft firms did not lead to the arrival of the vehicles themselves.

A second competition was announced in September, 1896, by the Royal Agricultural Society of England. Two classes were arranged: one for vehicles to take the place of light spring carts, and to carry loads "up to two tons"; the other for vehicles "capable of taking five tons." Three entries were received for the lighter class, and none for the heavier class, but only the Leyland van reached Crewe on the 10th of June, 1897, for tests at the hands of the judges. The practical collapse of these two competitions was very disconcerting to those who had a belief in the future of the commercial motor, but plenty of evidence was subsequently forthcoming to show that builders and designers, notwithstanding the tremendous difficulties by which they were confronted, were able to make headway.

It is not, of course, possible to include a complete historical retrospect in this paper, even were it desirable. The object is rather to put on record certain facts which must be held to support the contention that there has been a remarkable and satisfactory growth in the number of successful instances of use for commercial purposes. It is open to anybody who desires to make a closer study of successive developments to turn up a paper on the subject of "Heavy Motor Traffic," which was read in this room, under the chairmanship of Sir John I. Thornycroft, on November 5, 1903, since which date the opportunity for the wider employment of commercial motors, whether vehicles or or tractors, has been increased by reason of the less disadvantageous conditions of the heavy motor car order, 1904. Before that order came into force, on March 5, 1905, the unladen weight of any motor car might not legally exceed 2 tons 19 cwt. 27 lb., while any development of public-service vehicles was virtually prohibited by their falling within the speed limit of five miles an hour. To-day's legal position is not entirely satisfactory, but it is, none the less, one under which a large measure of advance has been rendered possible and has been achieved. It is not out of place, in these circumstances, to acknowledge the influences which brought about the issue of that order, and to congratulate this club, the Commercial Motor Users' Association and the Society of Motor Manufacturers and Traders upon the manner in which they harmoniously co-operated to secure the ends in view.

The Testimony of Public Trials.

There is a sharp division of opinion as to the continued value of road trials under independent observation. A debate on this subject took place a few weeks ago at a meeting of the Society of Road Traction Engineers, when a motion to the effect that their value is *nil* was defeated by a large majority. The accompanying table has been specially prepared, with the object of showing the improvement to which such open trials testify, and attention may more particularly be drawn to the column which

*Paper read before the members of the Royal Automobile Club, London, November 26, 1908.

PROGRESS OF THE COMMERCIAL VEHICLE—SUMMARY OF, AND LOST MILEAGE IN, CERTAIN COMPETITIONS.

Year	ORGANIZING BODY	NUMBER OF MACHINES				MOTIVE POWERS AT "FINISH"		Maximum Load Carried, Tons	Maximum Scheduled Mileage Per Vehicle	Percentage of Miles Lost	PRIZES	
		Entered	Presented	Started	In at Finish	Steam Propelled	Internal Combust'n				Offered	Awarded
1897	<i>The Engineer</i>	17	1	*	*	..	..	0.5	100	..	£1155	Nil
1897	R.A.S.E.....	3	1	1	1	1	..	..	..	..	£300	Silver Medal
1897	A.C.F.....	15	12	10	7	5	2	5.5	192	22.4	None	None
1898	L.S.P.T.A.....	10	4	4	4	4	..	4.7	143	14.7	£225	£225
1901	L.S.P.T.A.....	13	11	9	8	6	2	6.3	168	12.0	Medals	Medals
1903	A.C.F.....	65	57	57	50	2	48	7.1	555	9.5	"	"
1907	R.A.C.....	60	59	56	50	11	39	5.0	1582	7.3	"	"

*Competition abandoned.

†Judges reduced test run to one of 12 miles.

sets out the percentage of lost mileage. Not every competition is included, but there are sufficient for the purpose, and none of these have been picked to suit the occasion. They constitute a representative series, and examination of the figures must be held to establish a very good case for the utility motor. It will be observed that, going back eleven years, no less than 22.4 per cent. of the attempted mileage was not accomplished in the first "Poids Lourds" of the French Club; the first trials at Liverpool resulted in a loss of 14.7 per cent.; the third trials at Liverpool, in 1901, demonstrated an improvement to 12 per cent.; the big French trials of 1905 showed 9.5 per cent. of lost mileage; the largest commercial motor trials which the world has known, those which the Royal A. C. organized in the fall of 1907, gave the really splendid result of only 7.3 per cent. of lost mileage. No dispassionate man of business can afford to ignore these proofs of steady progress toward reliability. My own view is that necessity for such trials is over; they have admirably served the purposes and no more are wanted.

The Testimony of the Satisfied User.

It goes without saying that a not inconsiderable proportion of those who, during the years 1899 to 1902, purchased vans, lorries or other commercial motors were disappointed in the results which they obtained, and one may cut a long and somewhat painful story short by stating that every pioneer buyer passed through the most troublous of vicissitudes. One might cover pages with mechanical faults, inefficiency and financial loss which fell to the lot of those who bought a few years too soon. The memory is naturally unsavory, but it is shortsighted for any people with haulage interests to be influenced by old and out-of-date results. These references apply to occurrences which were experienced only from six to nine years ago, but it must be remembered that improvements in the heavy section of the industry have been not one whit behind those in connection with the lighter branches. In proof of this assertion, it is satisfactory to be able to produce evidence of the revulsion of feeling in favor of the business motor during the last few years.

By the courtesy of the proprietors of the *Commercial Motor*, I have full access to a very complete list of owners. This list is subdivided into 16 classes, as follows: (1) Bakers and flour dealers; (2) brewers; (3) brickmakers; (4) building contractors; (5) cabinet makers, general furnishers and stores; (6) carriers and transport companies; (7) gas companies; (8) hotels (omnibuses); (9) laundries; (10) market gardeners and fruit growers; (11) millers; (12) mineral water manufacturers; (13) municipal and other local authorities; (14) provincial omnibus companies and proprietors of charrs-à-bancs; (15) quarry owners, and (16) various manufacturing and other trades. Communications were addressed a few weeks ago to over 700 owners, and the figures in the second table controvert any suggestion that purchasers are not increasing the number of their motors or are becoming disgusted with the machines which they have acquired. The summary of the 342 replies is in structive and really conclusive. It is not suggested that these tabulated increases furnish a complete census of return, for many owners are either independent or indifferent when requests of this kind reach them. Some think it unnecessary to reply; others regard the data as peculiar to their own businesses and not to be divulged, and the names of a fair proportion are retained only by the clerks to the registration authorities. It is justifiable, notwithstanding the admitted deficiencies, to claim that the 342 replies in question are of a representative character, and in no sense selective, for nothing has been held back. Eight owners, and no more, gave adverse opinions.

Two correspondents who are large owners of vans and lorries, respectively, Messrs. James Shoolbred & Co. and the Eastern Motor Wagon Company, Limited, have given permission to me to quote their actual records of lost mileage for the last twelve months. Messrs. Shoolbred, for 30 vans in the four months ended February last, and for 31 vans in the eight months ended October last, lost a total of 562 van-days in a possible total of

9,446 van-days, or less than 6 per cent. No overtime work is done on these vans, and no mechanical night staff is kept; further, "vans off the road" includes all accidents, all tire repairs, all time occupied in repainting and revarnishing the bodies, and all adjustments and maintenance of the chassis. The firm has done its own overhauls, since January 1, 1907, and it keeps only one engineer, one junior and two mechanics, for the whole supervision and running of a total fleet of 37 vans; the six newest ones are purposely omitted from the foregoing analysis. The summary is that they have kept in 14-5 vans per day throughout the year, one of these being in for its regulation overhaul, and the average of 4-5 van being in for small repairs. This performance may be stated as less than one spare van for each 16 owned, and full work continuously from the rest of the fleet.

The Eastern Motor Wagon Company, Limited, now has twenty steam wagons in regular service throughout the metropolitan area. Half of these work on the basis of a fixed five days per week (about 70 hours of service) under contract, each Saturday being reserved for examinations, adjustments, cleaning and the like, and to give the drivers, some of whom average as much as 250 miles per week, a rest. The others work six days a week. The growth of this company's fleet has taken place as follows: 1905, three wagons; 1906, eight wagons; 1907, twelve wagons; 1908, twenty wagons. Of these machines, nineteen carry five tons each when used without a trailer, and haul three tons more when a trailer is used, which is generally the case. The other machine is a rubber-tired vehicle, for loads of about three tons, and it averages 300 miles a week. The company's experience shows that the lost journeys are less than 5 per cent. of the maximum. This compares with about 10 per cent. in the years 1902-1903. The improvement is partly attributed to the progress in construction, but so reasonable a loss as 5 per cent. cannot be maintained, especially in contracting work, without capable administration, efficient mechanical supervision and proper facilities for the making of overhauls and adjustments.

Omnibuses for City and Country Uses.

The development of motor bus traffic in London, and generally in various parts of the country, has specifically occurred within the last four years. The totals of motor buses in the metropolis have been, at October 31 in each of the four periods of twelve months now ended: 1904, 15; 1905, 162; 1906, 754; 1907, 917, and 1908, 1089. The motor bus, as did the steam lorry and the one-ton van in earlier years, quickly gave rise to much trouble for those who became its pioneers. In London heavy losses have been incurred, and these are attributable to several causes, of which five may be quoted: Excess of traveling facilities over public demand; the cost of training drivers; the absence of experience on the part of the managements; the excessive working hours, and, in some cases, unsuitable material, incorrect gauging and bad fitting. It is unnecessary to labor any of these points, but it may be some consolation to shareholders to know that matters are now vastly improved, and that there is every reason to believe that the original estimate of an inclusive working cost of 10½d. (21c.) per mile will prove to be ample. Skidding and side-slipping difficulties have yet to be overcome, although improved driving has greatly reduced the incidence of claims, but this is still the largest uncertain factor which attaches to the business of motor bus operation at the present day.

The accumulator-driven omnibus has been on the streets of London for sixteen months and has proved that 2d. (4c.) per vehicle mile is ample for battery maintenance.

So far as country motor bus services are concerned, the most satisfactory reports are those from railway companies, and it has to be admitted that a number of smaller undertakings have come to grief. Against these cases of failure, however, it is only right to note that others have paid moderately, and that the use of motor charrs-à-bancs is on the increase for touring and pleasure parties. Such country services appear to require, in a number of cases, a fare basis of not less than 2d (4c.) per passenger-mile, but this is not excessive, having regard to convenience.

There are not less than sixty motor vehicles now under contract for the conveyance of His Majesty's mails, as compared with two—in the parcel mail between Liverpool and Manchester—in the year 1902. This service is practically limited to the parcel mail, in respect of which the railway companies of this country charge an all-round rate of 0.55d. (6.1c.) per lb., station to station. It is obvious that the Crown is paying a rate which admits of huge economies, although the contention of the railway companies, that the rate does not pay them in the case of odd parcels which have to be conveyed between points at opposite ends of the United Kingdom, cannot be overlooked. There is, however, only a low percentage of "lean" work. In any event, the postal authorities are certainly not unwilling to pay as much as 1s. 3d. (31c.) per vehicle-mile for a two-ton van, but competition between the contractors has already witnessed a cutting of this rate to below 1s. (25c.), a state of affairs which can only be regarded as wholly unnecessary. No breach of confidence is being committed when it is put on record that the next few years will unquestionably witness a very large development of the motor mail, both in this country and in certain of our colonies, in conjunction with passenger conveyance. In the London-Brighton service, which is conducted by Thomas Tilling, Limited, only two journeys (119 miles) were lost out of a possible 1008, aggregating 59,976 miles, or a mileage loss of 0.198 per cent. On the London-

registered takings, in addition to any gratuities which he may receive, out of which payments the driver has to pay for his own motor spirit. This revolutionary change in the habits and customs of the London cab is proceeding apace, and the men appear to have accommodated themselves to the alterations with remarkable quickness. The proportion of ex-horse cabbies in the employ of the General Motor Cab Company, Limited, is no less than 67 per cent. Prior to the advent of the motor cab these men used to pay jobmasters so much a day for the use of a vehicle and one or more horses, and to keep any balance of earnings for themselves.

Costs and Performance.

The undeniable progress of the last few years is measured by higher performance in relation to cost. The cost per vehicle-mile is uniformly less in each class for equal loads than it was even a couple of years ago, while lost earnings and disturbance of business generally are virtually disappearing factors in the problem. It was necessary, four or more years ago, for the purchaser to accept a great number of uncertainties. He paid a high price for the machine in the first instance, and he did not know what it was going to cost per annum. To-day the purchaser is in a happier position. He can, in many cases, obtain guarantees as to maintenance, whether of rubber tires or of the mechanical

ANALYSIS OF 342 RETURNS FROM OWNERS OF COMMERCIAL MOTORS.

CLASSIFICATION	No. of Returns Re- ceived	GROWING NET TOTALS FOR THESE USERS											
		1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908
1 Bakers and flour dealers.....	12	..	..	..	1	1	1	2	6	9	12	17	42
2 Brewers.....	31	..	..	3	12	19	34	40	62	77	85	102	113
3 Brickmakers.....	17	..	..	..	..	4	7	12	20	25	32	37	..
4 Building contractors.....	14	..	..	..	..	1	3	8	10	31	38	49	57
5 Cabinetmakers, general furnishers, and stores.....	23	..	..	1	2	7	9	13	19	40	65	106	151
6 Carriers and transport companies.....	34	..	..	..	..	..	26	64	67	129	179	212	234
7 Gas companies.....	11	..	..	..	..	..	..	2	3	10	17	27	31
8 Hotels (omnibuses).....	16	..	..	..	..	..	..	2	5	7	7	14	20
9 Laundries.....	12	..	..	..	..	..	..	5	6	13	18	23	26
10 Market gardeners and fruit growers.....	15	..	..	..	..	1	4	10	16	19	20	21	..
11 Millers.....	37	..	..	..	5	11	17	24	33	40	52	66	77
12 Mineral water manufacturers.....	9	..	..	..	..	..	2	3	3	5	9	14	15
13 Municipal and other local authorities.....	42	..	..	2	6	8	20	32	42	54	73	84	94
14 Provincial omnibus companies (and proprietors of char- à-bancs).....	23	..	..	..	..	..	..	7	61	155	205	238	276
15 Quarry owners.....	12	..	..	..	..	1	3	4	6	10	12	14	18
16 Various manufacturing and other trades.....	34	..	1	2	2	3	6	10	20	30	37	65	82
Totals.....	342	..	1	8	28	55	126	227	365	646	853	1083	1293

Hastings and London-Cambridge routes, for which Milnes-Daimler, Limited, contracts, only 72 miles were lost out of a possible 46,264, or 0.155 per cent.

Few people realize that the motor cab has jumped into popularity in so short a period as twenty months, but this is a fact. It was only on March 21, 1907, that the General Motor Cab Company, Limited, gave an inaugural luncheon and immediately placed upon the streets of London the first seventy Renault cabs which marked the departure from haphazard and small-scale exploitation in favor of a big organization on a truly commercial scale. The motor cab, as a means of locomotion in London, is no new proposition. For example, one may recall the yellow-bodied electric cabs of 1897, which so quickly came to grief. Many critics in the summer of 1906, when only comparatively few of these mechanical hackney carriages were on the streets of the metropolis, expressed the view that the motor cab was not needed, in view of the convenience and speed of the motor bus. That estimate of the situation was a false one, and the privacy of the motor cab, apart from its greater speed and range, necessarily prevented the motor bus from being at any time a competitor. It may be of interest to quote the totals of mechanical hackney carriages for which licenses were in force in the metropolis at certain dates: December 31, 1903, 1; December 31, 1904, 2; December 31, 1905, 19; December 31, 1906, 96; September 30, 1907, 604; December 31, 1907, 723; March 31, 1908, 958; September 30, 1908, 2,273.

The practice in London is to pay the driver 25 per cent. of the

parts; he can obtain written assurances from users who have been employing vehicles of the same make; he can obtain drivers who have had experience on the road—a qualification which is certainly necessary for men who have to go far, and particularly for those who are in charge of steam wagons; he can associate himself with a powerful central organization, which now numbers upward of 320 members, in the shape of the Commercial Motor Users' Association, and that at the reasonable annual subscription of one guinea; he can obtain low and inclusive insurance rates, unless exceptional risks are involved. Briefly, he can take his choice, in the following classifications, with the knowledge that his total outgo per vehicle-mile will not exceed amounts indicated—one-ton van (petrol.), 5d. (10c.); two-ton vehicle (petrol.), 6½d. (13c.); three-ton lorry (petrol.), 8d. (16c.); five-ton tractor (steam), 8.5d. (17c.); five-ton tractor (steam), 9.5d. (19c.); five-ton wagon (steam), with trailer, 1s. (25c.).

In conclusion, I desire to emphasize two points upon which I feel very strongly. The first of these is that nothing has occurred to weaken my conviction that steam is the better power for loads in excess of three tons, except in circumstances where the higher speeds due to the use of rubber tires are of marked advantage; the second is that any contractor, who purchases one or more motor vehicles or tractors for the purposes of hire must, if he is to make any money and not to go bankrupt in a couple of years, obtain at least 60 per cent. more per mile under contract than is set forth in the preceding paragraph, where the typical costs are for owners who can find practically full work.

ABOUT THE AUTO'S INDISPENSABLE FOOTWEAR

WHILE much is made of tire troubles, too little is said or heard of the virtues of the automobile's indispensable footwear. With a little care and attention tires are capable of much better and more economical performance than they are generally credited with rendering.

The first precaution to be taken by the autoist is to keep his tires inflated at proper pressure, as nothing will wear them out as quickly as running on them half inflated. Roughly speaking, a tire is properly inflated when it will stand up full and round under the pressure of the loaded car.

Novices are always afraid of inflating their tires too much, with the result that they rarely inflate them enough. They are very much in the wrong, for an ill-flated tire rapidly wears out. Few hand pumps are capable of exercising a pressure of 100 pounds per square inch and good tires can stand a pressure at least equal to that, so there is slight danger of over-inflating.

But every autoist should have a pressure gauge so as to be able to determine the exact amount of pressure in his tire. Following is a table of approximate pressure for tires:

50 pounds in 3	inch tires.
60 pounds in 3	1-2 inch tires.
70 pounds in 4	inch tires.
80 pounds in 4	1-2 inch tires.
90 pounds in 5	inch tires.

The rear tire should be inflated 5 to 10 pounds higher than above table. Improper inflation is the commonest cause of rim-cutting. During the first ten days they are used tires should be frequently inflated, as the cover increases progressively in volume for the first ten days or so, and the air pressure is thus diminished. After this period, or when the cover has reached its full dimensions, it will be sufficient to pump your tires every ten days or three weeks. If more frequent pumping is necessary something is wrong; a leaky valve or a "slow" puncture.

Of course, a deflated tire should never be driven on, as there is not only the certainty of damaging both tube and casing beyond repair, but the danger of loss of control and serious accident if high speeds are indulged in. An entirely deflated tire is easily detected by the unusually sharp jars transmitted to the body of the car, but often a "slow" puncture is not detected until considerable damage has been done by rim-cutting. If the following is borne in mind the deflated tire may be detected before enough deflation has taken place to cause serious damage:

A deflated front tire will usually make itself known by the difference it causes in the sensitiveness of the steering apparatus. A deflated rear tire, especially if there be much weight in the rear of the car, often gives a peculiar "feel" to the steering wheel, as if the vehicle were traveling over a greasy road. The rear of the car swings about abnormally with a slight skidding tendency. When a driver feels this sensation on a good dry road he should think of his rear tires.

Care of Tires in the Garage.

Should the car be much in use it is preferable to leave the tires inflated, but if the car is not used for some months it is better, after having placed jacks under the axle, to partially deflate the tire. If this is done it will add greatly to the life of the tires, as they are then bearing only the pressure of the air with which they are inflated, which is very slight, whereas when supporting the weight of the car this is exerting a continual unnecessary strain on the walls of the cover and the pressure of the air in the tire also exerts more or less of a strain. By adopting this course it is estimated that the life of the tires will be increased by at least half the time the car stands idle. Never allow the car to stand with one or more tires

deflated without jacking it up to relieve the pressure.

In winter it is best to remove the tires from the wheel, and after being sure that they are perfectly free from oil, water, etc., wrap them with a soft cotton cloth to keep out the light and store them in a place of moderate temperature. Or the tires may be deflated and left on the wheel and then wrapped in cloth and the car stored in a place of moderate temperature.

Be sure the size of the tires is equal to the weight of the car. The limit of weight which each size tire will stand is given by the makers of it. Improper attachment of a clincher tire to the rim is certain to result in trouble before many miles are covered, as the inner tube is pretty sure to be caught between the shoe and the rim, or between the shoe and a retaining stud, the result of which is the well-known "pinching." The portion of the tube near that which is caught is subjected to increased strains, while in a stretched condition, and the tube will soon burst or tear at the point of pinching. If the outer shoe is not caught properly between the rim and stud, great damage to the shoe may result, and in the case of many tires, the inner tube may blow out through the space between the shoe and the rim near the improperly set stud.

Natural Enemies of Rubber.

It should be kept in mind that tires have three natural enemies that are destructive to rubber; light, heat and oil, to which might also be added, water. Light and heat have a chemical effect upon rubber, causing very speedy deterioration. Oil, especially gasoline, is a ready solvent for rubber, and will rot the tire quicker than any other substance. Water tends to rot the canvas in the shoe, rust the rim, and destroy the rubber. It should be remembered that wet tires are cut very easily, so that it behooves one to be very careful while running a car on muddy or wet roads.

Heating of Tires While in Use.

It is well known that in a long run the tires become considerably heated, but the cause for this is not so well known. The heating is the direct result of the frictional action between the outer shoe and the inner tube. It can be in a large degree avoided by rubbing French chalk over the inner tube before it is inserted into the shoe; this acts as a lubricant and reduces the friction between the two surfaces to a minimum, and, consequently, diminishes the amount of heat generated and the amount of wear experienced.

Spare Tires and Their Care.—Extra Shoes.

An extra outer shoe should always be a part of an autoist's car equipment. But it should be thoroughly protected against light, heat, oil and dampness. Many a tire that has never been used is ruined by being carried on the car in such a way that water is collected in the tire every time the car is washed or run in a rain storm, and becomes soaked into the fabric of the tire. It is necessary to keep the extra outer shoe covered in some way, so that it may be protected against not only light, heat, oil and dampness, but against dust and chafing as well.

Several extra inner tubes should also always be part of an autoist's car equipment, and care should be taken to see that no deterioration takes place before they are put into use. To put an inner tube, uncovered, into a box full of loose tools, oil cans, etc., is only a little better than throwing it away. The tools will chafe and the oil will rot it, so that if it holds air at all when inflated, it may soon burst under the weight of the car.

Tire Repair Parts.

A tire sleeve is often of much value where a pit is occasionally in the casing, as it will give the tire external support and prevent the bursting through of the inner tube. In lieu of a tire sleeve it is possible to obtain the same results for a time by the use of a strap, which may be wound about the tire, but the

From a little book by C. A. Shaler Company, Waupun, Wis., makers of vulcanizers and tire repair materials in general. The information is so pertinent and so full of sound common sense that the temptation to give it wider circulation is irresistible.

leather sleeve is more substantial. The strap or the sleeve should not be applied with the air in the tire at a higher pressure than 15 pounds. After it has been put on, however, the tire requires to be pumped up again, and a strong well-made pump, even if it costs a little more than seems to the uninitiated to be a reasonable price for such an instrument, will soon pay for itself in the satisfaction it gives.

It should be kept in mind, however, that tire sleeves and the like are for temporary repairs only, and that the injured tire should be vulcanized at the earliest possible moment. To quote the manager of one of the largest tire factories in the world: "A tire sleeve does not perfectly conform to the shape of the tire; water and sand get into the injured portion of the cover and thereby rot the fabric, and eventually the cover will be made useless."

Another very valuable device for an emergency repair of a blow out in the blow out patch, composed of fabric and rubber, which can be placed between the tube and the casing to prevent the tube from blowing out through the hole in the casing. If a tire sleeve is placed over the hole, the repair is still further strengthened. Tire repair plasters made of fabric are also made to go between tube and casing, in the event of a small hole occurring in the casing. They are quite similar to the blow-out patches, but are much smaller. Another handy little device and one that is quite ingenious, is the tire repair plug; a mushroom shaped rubber plug which can be inserted into a pin-or-nail-puncture, and which will for a time prevent leakage without the use of cement.

Quick Repairs for Inner Tubes.

For the smallest puncture a patch two inches in diameter should be used. The surface of the tube should be thoroughly cleaned for a space at least one-half inch larger in diameter than the patch to be applied, by first rubbing hard with a bit of waste or cloth moistened with gasoline, until all traces of "bloom" or the French chalk on the tire have been removed, and then slightly ruffing up the surface of the rubber with very fine sand paper. It is best to use the prepared patches which are procurable from the tire makers, but if a patch be cut from an old inner tube, this should be carefully treated on the underside in the manner indicated above, and the edges bevelled. It is better to cut the patch in circular shape, as a square patch will start to come off comparatively easy at the corners. Cover the patch and the clean place on the tube with a thin coating of high grade heavy rubber cement (inferior grades are worse than useless) and allow it to dry thoroughly. Then apply a second coating. When the second coating has become "tacky" (i. e., not moist, but so that it will stick to the fingers when touched) the patch can be applied. Hammer it well with a bit of wood and allow it a minute or so in which to "set" before pumping air into the tube. If this is not done, failure is almost sure to issue. It is also very necessary to wait until the cement is quite dry and tacky before applying the patch. There is no cement for cementing rubber that will withstand any considerable degree of heat, so that nine times out of ten the cement patch will work loose while the car is running at a high rate of speed with great danger to the car and its occupants.

Quick Repairs for Outer Casings.

In the case of a nail puncture, the hole in the outer shoe should be covered by sticking on a bit of prepared canvas which the tire makers can supply, to the inside of the casing, in order to prevent sand, water, and dirt from working in between inner tube and outer casing. To do this the same rules must be followed as in the case of applying a patch to the inner tube.

In event of cuts which extend through the outer shoe, a strip of canvas sufficiently wide to cover the cut completely and to extend beyond on each side, and long enough to catch between the shoulder and the outer rim, should be fitted on the inside of the shoe before the inner tube is inserted. This strip should fit closely to the inside of the shoe, and it is well to

attach it for at least a part of its length by using cement. The object of this strip is to prevent the tube from blowing out through the cut, and it should, therefore, be drawn sufficiently tight when the tire is attached to the rim to form a supporting band about the tube. Of course, if one has the tire sleeve, or blow-out patch before mentioned, they should be used.

In replacing the tire, the inner tube should be rubbed well with French chalk and inserted, if possible, in such a manner that the patch on the tube will not come against the patch in the shoe, and care should be used that the loose ends of the canvas strip are securely caught between the shoulder of the tire and the edges of the rim. After a slight inflation the tire sleeve, previously described, should be placed tightly around the tire and rim at the point of injury. A make-shift for this tire sleeve is a piece of ordinary "duck," which can be wound about the injury and tightly fastened to hold it in place.

Most Important Tire Tool for the Autoist.

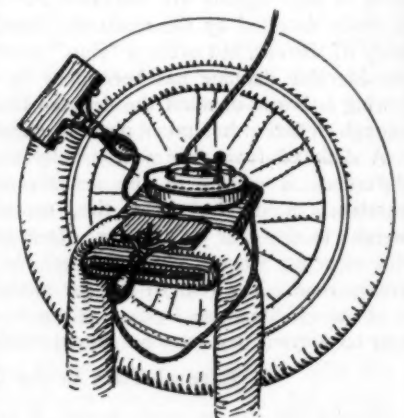
Every autoist should have a vulcanizer, not for a roadside repair kit, but for actual work in keeping his tires in absolutely as perfect condition and appearance as they were the day he bought them. By the use of a good vulcanizer any cut, puncture, tear, or slit in an inner tube can be mended in a very short time, so that the mended portion is even stronger than the balance of the tube. By the use of a good vulcanizer the autoist can save 75 per cent. of his tire repair bill, and get three times the wear that he ordinarily would get out of a set of tires. Think what this means. You can keep the stone cuts in your casing filled in and repaired so that both their strength and appearance is the same as when the tire was purchased. Keeping the casings filled in this way will absolutely prevent sand pockets and will do away with practically all blow-outs, for it is very seldom that a blow-out takes place in a perfectly sound portion of the tire.

A blow-out invariably occurs where there has been a weakening of the fabric by the rubber having been cut, and sand, dirt, and water having been allowed to creep in, tear away the rubber, and rot the fabric. It will mean more to the autoist than any other thing he can do to go over his casings from time to time, say once a month, and repair each cut in the casing, no matter how small.

The tire does need to be removed from wheel, or wheel from car. The hole is cleaned with gasoline and sand paper, and a coating of vulcanizing cement smeared in and around the cut. The cement is allowed to dry and the hole is filled with crude rubber. The vulcanizer is then clamped onto the casing by means of a chain and bolts, after which the wheel is jacked up and enough air let out of the tire, so that when the vulcanizer is snugly

bolted to the tire, it will conform exactly to the concave face of the vulcanizer. The vulcanizer is left in this position for thirty minutes at a temperature of 250 to 275 degrees Fahrenheit.

Tubes are repaired in much the same manner. The tube is cleaned, cemented, and pieces of crude rubber, as nearly as possible conforming in size and shape to the hole, placed in the hole, and a final piece one-eighth of an inch all around larger than the hole placed over all. The tube is then placed on a shelf, furnished with the vulcanizer, and the flat side of the vulcanizer clamped down on the tube. Vulcanization takes place on the tube in about fifteen minutes.



The Shaler Vulcanizer Shown in Service.

LETTERS INTERESTING AND INSTRUCTIVE

ONE MOTOR CAR CAN BE SLOWED QUICKLY.

Editor THE AUTOMOBILE:

[1,676.]—As I have been a constant reader of "The Automobile" for the past two years, I have noticed in your "Letters Interesting and Instructive" many useful and suggestive ideas, some of which have helped me out of many a difficulty, and many of which I have put to practical tests.

And, now, I take the liberty of asking a question myself. Why do some manufacturers and users of automobiles claim that the main shaft of an engine (the flywheel shaft) should not be hung on ball bearings, but should be on plain bearings? If the ball bearing idea is wrong, why do not more of them supported in this way give trouble?

Also, why can a two-cylinder motor double opposed be slowed down more than a four-cylinder under the hood with the same conditions governing? I mean by this, suppose you come to a street crossing where there is a rise and you brake your car without throttling it down.

I speak of no one car over another in this letter. It is simply a question which has arisen among men using and buying autos.
Peabody, Kan.

C. E. DAVISON.

It is out of the question to reason for the various designers of automobiles. Since both kinds of bearings work, it is a mere matter of selection, just as is the color of the finish; some like "red" and a preference for "maroon" is not unknown. Buyers can find both kinds, and are not, therefore, compelled to go against their inclinations.

Why a double opposed motor can be slowed down more than a motor with four cylinders, is a matter depending upon a number of circumstances, in some cases of which what you say is true. If you mean that some motors will run slower than others, then the reply is that the flywheel in such cases favorably influences the situation. If the flywheel effect is great in proportion to the conditions that demand such effect, the motor can be run slow. With a light flywheel the reverse would be true.

TRANSCONTINENTALISTS AFTER INFORMATION.

Editor THE AUTOMOBILE:

[1,677.]—As a friend and myself are planning a transcontinental automobile trip for some time in the Summer, we would like to have your valuable assistance in the matter of picking a route. New York is the starting point and San Francisco the ultimate destination. Except for passing through Dayton, O., and Kansas City, our itinerary is immaterial. After studying various volumes of the Automobile Blue Book we have selected two possible routes for the eastern part of our journey, but we are undecided as to which one is preferable. The first is: New York, Syracuse, Buffalo, Cleveland, Columbus, Dayton, Indianapolis, St. Louis, Kansas City, Denver, Salt Lake City, to San Francisco. The other one, which is a trifle shorter, takes in New York, Philadelphia, Altoona, Pittsburgh, Columbus, Dayton, and so on. Now, which of these would you recommend? It is not our intention to break any records, as we have plenty of time and want to enjoy the tour.

We are also somewhat in doubt as to which would be the better way across the Rocky Mountains from Denver—via the southern route or the northern. Any information you can give me through your columns will be greatly appreciated.

New Haven, Conn.

DICK WILES.

The first route mentioned should serve your purpose very well, indeed. See Section No. 4, of "The Automobile Official Blue Book," for maps of the several routes already followed by transcontinentalists.

WIND SHIELD ON PRINCIPLE OF THE DODGER.

Editor THE AUTOMOBILE:

[1,678.]—Will you kindly tell me through your "Letters Interesting and Instructive," if there are any manufacturers who make automobile wind-shields on the principle of the "dodger" on a steamer's bridge, the material of canvas, celluloid or other light material? A glass shield is very heavy and more or less dangerous should an accident occur and it seems to me that a dodger could be made which coming to the operator's shoulders or even lower would carry the wind over the heads of the occupants of the car.

Saint John, N. B.

KOYDEN THOMSON.

You probably can get just what you want from several makers of wind-shields.

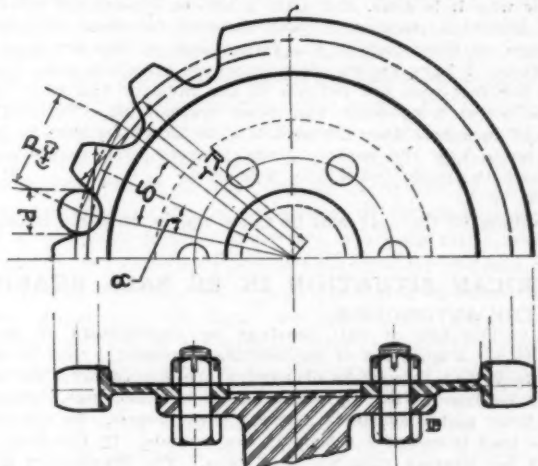
THE PRIME CAUSE OF NOISE IN CHAINS.

Editor THE AUTOMOBILE:

[1,679.]—I am a constant reader of your paper and have been wondering if, through "Letters Interesting and Instructive," you could not give me some light on a subject which has perplexed me for a long time. I have owned a number of cars, all of them chain driven, and aside from the other qualities of the cars, the efficiency of the respective chains as to wear, etc., but especially as to noise, has differed a great deal. This question of the noise has bothered me, and so far I have been unable to determine exactly why some chains are noisier than others. Can you throw any light on the subject?
New York.

"NOISE."

Yours is a question of sprocket design, not the chain, which causes the trouble. It is a comparatively easy matter to get good chains, but even when they are used, the noise is still there in many cases. The critical point in sprocket design is the radius (r), of the base line circle as determined by the chain, and the gear ratio to be employed. When these have been selected, we have the pitch, or the distance between centers of the rollers, and the diameter of the rollers. By the use of the accompanying drawing it is easily seen how important it is that the



Sprocket Layout, Showing the Mode of Procedure in Designing.

value for " r " be accurately calculated so that when we have spaced the circumference for the correct number of teeth each roller will seat properly on the sprocket. Any error in the value of " r " is multiplied by 6.2832 in the circumference, so it is easy to see why some chains will not seat evenly without binding if mistakes are made in finding " r ."

The following example may help to make this question clearer. Example:

Number of teeth = $N = 14$.

Distance between centers of rollers = pitch = $P = 1.25$ inches.

Diameter of rollers = $d = \frac{5}{8}$ of an inch.

$\alpha = 180^\circ \div N = 180^\circ \div 14 = 12^\circ 51' 25''$.

$R = \text{radius of pitch circumference} = \frac{1}{2} \times \frac{P}{\sin \alpha}$

$= \frac{1}{2} \times \frac{1.25}{.22252} = 2.8087$ inches.

$r = R - d = 2.8087 - .3125 = 2.4962$ inches. (This is the important dimension in designing sprockets.)

$C = \text{clearance.}$

There is one other matter that does not always receive its due measure of attention, i.e., the number of teeth should not be reduced below a certain minimum. It is not uncommon to see sprockets with 9 teeth, in designs in which the gear ratio cannot be arrived at in any other way. In such cases the

small number of teeth come as a necessary evil, yet even so sprockets with 14 teeth would be less noisy. One more point: increasing the diameter of the sprocket is equal to increasing the life as well. This is because the pressure on the teeth will be lessened, since,

$$P = \frac{H.P. \times 33,000}{2\pi R S}$$

In which,

P = pull in pounds;

R = pitch line radius in feet;

S = speed in revolutions per minute;

H.P. = horsepower to be transmitted.

In conclusion, then, it is to say, noise is the product of either badly designed sprockets or lack of attention in the maintenance of the chains. Certainly a chain is entitled to a little care; it has joints to hold grit, and, in time, lack of oiling and attention will do the trick.

CARE OF CARS FOR WINTER.

Editor THE AUTOMOBILE:

[1,680].—It would, I think, prove very useful to many of your readers to have you give in detail suggestions as to the putting away of cars for the Winter. Too many owners of machines store their cars, observing necessary rules about draining the water off, blocking the wheels, etc., but do not know sufficiently well how to do it, or why it is done, and after a severe Winter are more than apt to find that their cars have suffered for want of adequate knowledge on their part in the refinements of the art they have undertaken. I have known of cases where cylinders have cracked, despite the fact that the petcock in the radiator had been opened and the water supposedly had been drained off. Certainly the opinion of an expert upon the care of a car in winter storage, giving details as to how the engine, gears, brasses, etc., should be left, would be both timely and widely welcomed.

Roslyn, N. Y.

Something of the sort will be taken up, in an early issue.

AMERICAN SITUATION IN RE BALL BEARINGS.

Editor THE AUTOMOBILE:

[1,681].—The use of ball bearings on crankshafts of gasoline motors is not a question of engineering possibility; that is settled by the fact that thousands of motors are successfully and satisfactorily equipped with and running on ball bearings. Such use ranges from motor cycles to torpedo boat motors. In the former case the load is one of a relatively few pounds. In the latter case the load per bearing runs up to 14 tons. The illustration is of a French marine motor loaded with 10 tons per journal in regular service; the acceptance trial involved 14 hours run at 450 r. p. m. under a load per journal of 14 tons.

But it is not engineering feasibility alone that is the determining feature. There is also the question of cost. That is best considered in the light of the fact that the ball bearing crankshaft is the regular practice for a considerable number of years of many builders of automobiles.

With the feasibility from an engineering and from a cost standpoint thus proven by the best of all tests, practice, there is the question of durability. This again is definitely proven by the continued use, year after year, of the ball bearing crankshaft by the builders of four and of six-cylinder motors of from 15 to 50-horsepower as well as of the smaller motor cycle engines.

Remains the question of noise! Every builder of anti-friction bearings knows and every candid and reputable one will tell his clientèle that the only absolutely quiet bearing is a plain sliding journal well oiled. That does not mean that the ball bearing is necessarily noisy; quite the contrary. We have such bearings in use on organblowers where even the slight hum of the electric motor must be masked. What it does mean is that sounding box constructions and all sound magnifying constructions must be avoided. There is even a very decided indirect benefit since the most efficient mountings and mechanisms happen to be those that are without such sound magnifying or resonant effects. The cutting out of ball bearing noise has thus frequently resulted in the cutting out of noise producing elements generally. Some builders find ball bearings noisy in their motors, others do not so find them. The difference lies in the motors and usually in some rather small and apparently unimportant structural details. The writer agrees to find the cause and remedy the matter for any motor whose builder is sufficiently interested to send it to him for that purpose and to do that work free of all charges.

The ball bearing is in itself a new element of mechanism; possibly this should be modified into "relatively" new; relative as compared with the antiquity of the plain journal, but absolutely

new where knowledge of correct construction, material, workmanship and application is concerned. It is so trite an experience as almost to require no statement even that before any new thing is generally adopted there will be much trial, abandonment, retrial, finally, general adoption. The ball bearing is no exception.

In its various forms it is daily going into use by the many thousands—one form alone, that known as the Hess-Bright or DWF is supplied from one plant daily, thousands ranging from ¼ to 40-inch, and using balls from 1-16 inch to 4 inches diameter and costing from a few cents to several thousand dollars per piece. It may therefore be conceded, notwithstanding its relative youth, that the ball bearings has, as our French cousins would say, "arrived."

The crankshaft use of the ball bearing is in an earlier stage, that of trial, success by many, failure by a few, retrial, and in many cases final adoption. The instances of definite failure are almost none. The cases of dissatisfaction because of failure to recognize, or unwillingness to properly adopt other conditions to the requirements of the ball bearing are more numerous. In this connection a very general trait of humanity is interestingly brought out, since such trouble is experienced by the better automobile builders, whose self-reliance prompts them to ignore the advice, aid, and experience of the ball bearing specialist. On the whole, though there are defections among the users of ball bearings for crankshafts, there are more accessions.

This communication is prompted by the receipt of a letter from The Pope Motor Car Company, from which I quote:

"On page 759 of 'The Automobile' of November 20, 1908, appears an interview in which it is said: 'The other is the abandonment of ball bearings for crankshafts in favor of plain bearings in notable instances.' Now, our (Pope) experience with ball bearings in the crankshaft has been that, by the use of these ball bearings, all bearing trouble in the crank has been eliminated. When we adopted this style of bearing it was with us more or less of an experiment and was watched with a great deal of interest, but we have yet to replace our first ball bearing in a crankshaft. This is probably due to the peculiar construction which we employ and which construction is patented, and that is, casting steel plates integral with the engine base, so that when the steel yoke and engine base are machined to carry the bearings, the ball bearing is carried on a steel cradle or yoke which extends around its whole diameter.

"If any of the foreign makers have had trouble with ball bearings in the crankcase, it must have been due to inferior bearings or inferior mountings, and we believe that in justice to the ball-bearing crankshaft and yourselves, you should take some extended notice of criticism and refute statements of facts as they exist in this country."

It was not my original intention to say anything on this question of ball bearings for crankshafts. I know that the ball is rolling, and that though there will be occasional halt and slowing down the essential desirability of the ball bearing crankshaft, coupled with the already fairly considerable and in every way satisfactory and successful use will give it an increasing momentum. The logic of events and not anything that I can do or say will govern. But it did seem to me that the request of a pioneering user such as The Pope Manufacturing Company could not be ignored. The virtual command of a second letter: "We think that you ought to do for your own sake and for the sake of hundreds of other users of cars and also manufacturers who are using your bearings, is to come out with a strong statement," could not be ignored.

Philadelphia.

HENRY HESS.

APPRECIATION FROM A EUROPEAN SOURCE.

Editor THE AUTOMOBILE:

[1,682].—From a far away corner of Provence, let me assure you how much THE AUTOMOBILE is appreciated for news of the American automobile world. I infer that thousands feel the same way, for through three different sources I have tried to obtain from your office an extra copy of the issue of August 10. My last effort was to apply to you direct, when I received the following response: "No copies of the issue are on hand, and none have been returned by the news companies." If your publication sheet is always cleaned up as well as this, no wonder you are able to produce so excellent a paper. Long may it live and continue to gather readers as it goes!

As for its abounding interest for all interested in automobilism, I may say that I turn my copies each week over to the local garage proprietor, a Frenchman, who cannot read a word of English. He says he can keep better informed of the trend of new idea in accessories, tires, and the like, by merely looking at the pictures in THE AUTOMOBILE than by the belated news which drifts to him through the French papers. "Vive l'Automobile; very good," he says every week, as I hand him over my copy.

Cassis, B. du R., France.

B. McMANUS.

A VERMONT CITY WANTS AUTO FOR POLICE.

Editor THE AUTOMOBILE:

[1,683].—The Police Commissioners have been asked by the Board of Aldermen to investigate different gasoline police patrol automobiles. Will you advise us who makes such, or advise your advertisers through your columns?

Burlington, Vt.

HAGAR BROTHERS.



Lines of the Pierce Great Arrow 6-60 Seven-Seated Touring Car for 1909.

By CHARLES B. HAYWARD.

BUFFALO, Dec. 14.—With no less than five different chassis of varying powers and numerous distinctive types of bodies, the Pierce offering for the coming season sets a high-water mark where the range of models ever offered by a single manufacturer is concerned, as there are 35 styles of Pierce cars now listed. To begin at the top, which is appropriate in the present instance, as the Pierce name has been more closely associated with the production of high-powered cars, such as the 40 and 60-horsepower Great Arrow models, there will be no less than three distinctive six-cylinder models, rated at 60, 48, and 36-horsepower, according to the A. L. A. M. formula. With the exception of a few minor improvements, the 60-horsepower machine is the Pierce Great Arrow of the present year's design that has done so much to uphold the builder's name in contests and in the hands of a large number of users, while the 48 and 36-horsepower types are entirely new models, the specifications of which were adopted by Designer Fergusson this Summer, not long before going abroad. Besides these three six-cylinder models, there are also listed under the Pierce name two fours, one of which is the four-cylinder 40-horsepower car that has long been familiar, and a new town car model rated at 24-horsepower, which is an entirely new creation, besides being the smallest Pierce turned out by the Buffalo factory in the past two or three years. Up to a short time ago efforts at the Pierce plant were centered upon the production of these two types and a large number has already been delivered; according to Colonel Clifton, probably the last four-cylinder car to be put out under the Pierce name will have left the works by the first of the year, as the company may devote its energies henceforth exclusively to the six-cylinder type.

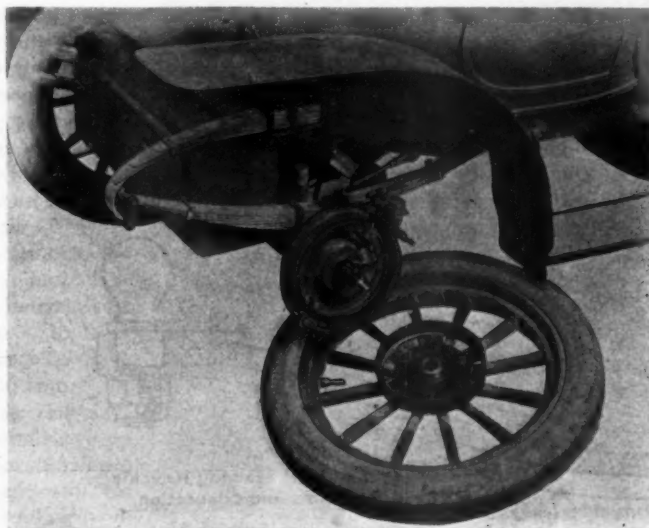
Series of all three models of the latter have been coming through in numbers together with the fours now being built, but despite the capacity of the big plant, deliveries have fallen considerably in arrears and a night shift of two or three hundred men has been continuously employed on machine work with the prospect that this will be necessary for some time to come in order to catch up; as the Pierce output of 1909 cars will doubtless be

the largest in the history of the company's activities to date, owing to the unusual number of models listed.

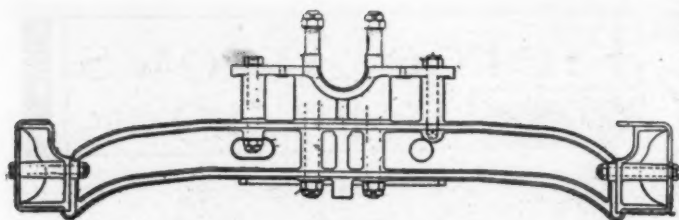
Some of the Motor Details.—That painstaking attention to detail of design and construction that makes for the maximum degree of reliability and extended service finds its highest exemplification in the Pierce, and it is accordingly characterized by numerous features of interest that would ordinarily escape any but an experienced eye. In the design of the 36 and 48-horsepower six-cylinder types, a departure has been made from previous standards by the adoption of twin-cylinder castings, though the T-head, or outboard valve port type has been retained. The cylinder dimensions of these two motors are $3\frac{15}{16}$ by $4\frac{3}{4}$ inches, in the case of the smaller, and $4\frac{1}{2}$ by $4\frac{3}{4}$ inches, bore and stroke, respectively, on the 48-horsepower model, the 60-horsepower six-cylinder car having 5 by $5\frac{1}{2}$ -inch cylinders. The valve operating mechanism has been improved by the substitution of an adjustable roller end at the cam in place of the solid plunger formerly used, while the use of a fiber block contact for the tappet tends to eliminate all noise from the operation of this part of the motor.

Mr. Fergusson is a strong believer in the use of aluminum where weight-saving or appearance are paramount, but will have none of it in positions of responsibility, so that while this material finds liberal employment in crankcase, gear-set housings, and body construction, the usual cast aluminum arms for the motor support are missing, two drop forgings of high-grade steel, attached to the crankcase by four through bolts, taking their place. These not only form a far more dependable, but also a much more elastic foundation for the motor. The forward frame brace is channeled to form a cradle for the radiator, its attachment relieving it of all torsional strains and making it very easily removable.

Lubrication is taken care of by the well-worked-out circulating system that has always distinguished the Pierce motors in this respect, and which makes for extreme simplicity and reliability on this all-important essential. A small gear pump attached directly to the side of the crankcase



Rear Springs and Brakes, Pierce 4-24 and 6-36 Models.



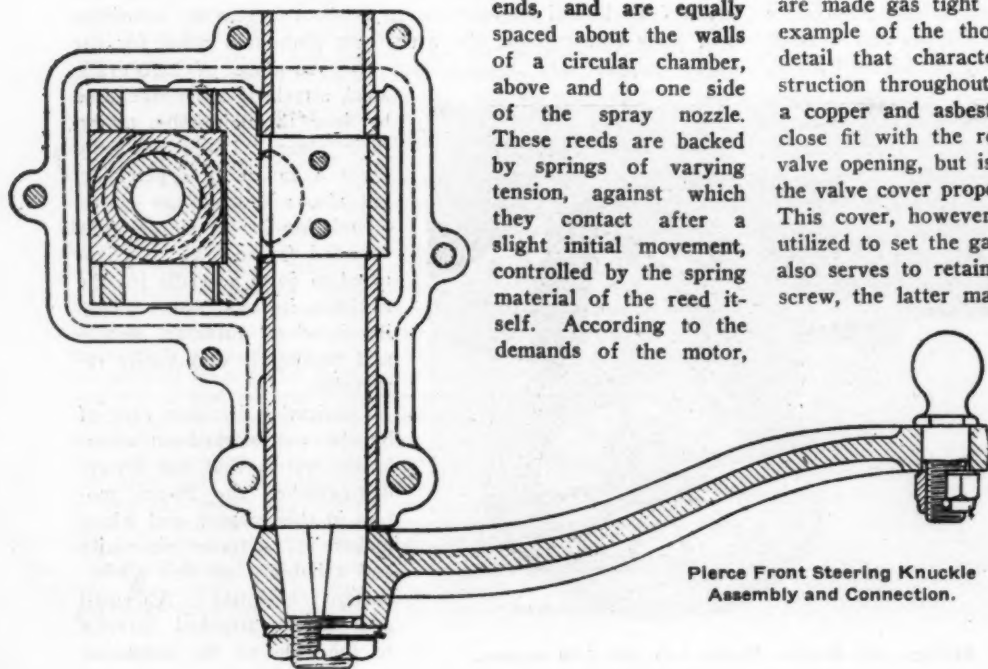
Drop-forged Motor Support and Crankcase Attachment.

and driven through a spiral gear on one of the camshafts, elevates oil from a well forming part of the crankcase oil pan, to a copper tank at the level of the cylinder heads. It is discharged into this tank through a double system of wire gauze filters, thus cleaning the oil every time it is circulated. From the tank it flows by gravity through 1/16-inch outlets to copper tubing of large bore to the seven main bearings of the six-cylinder motor, from which it is distributed by means of centrifugal force through the drilled crankshaft. A sight gauge conveniently located indicates the height of the supply in the reservoir. As the bearings are continually flooded with oil by this system, baffle plates are employed to prevent an excess being splashed on the piston. No oil rings have been found necessary and a liberal supply of lubricant is insured the wrist pin and small end bearing of the connecting rod by turning a wide shallow groove in the piston at the pin openings and by providing three recesses in the upper face of the bearing to retain some of the splash. The oil outlets of the tank are recessed to take washers with variable sized openings, so that the feed may be regulated in this manner. The other auxiliaries, such as the centrifugal circulating pump and the magneto, are driven from separate shafts on each side of the motor, the driving pinions being self-contained in the aluminum housing of the timing gears, thus greatly facilitating the assembly and dismounting of this part of the motor. Phosphor bronze bearings are used throughout, their alignment in the case of the crankshaft being perfected by reaming in place.

New Air Valve a Departure.

Particular interest attaches to the new type of auxiliary air valve on the carbureter, as the adoption of spring controlled reeds in place of the usual piston or diaphragm type, marks somewhat of a departure from current practice in this respect. On the carbureter for the smaller motor, there are two of these reeds, and on the larger, three. They are placed vertically,

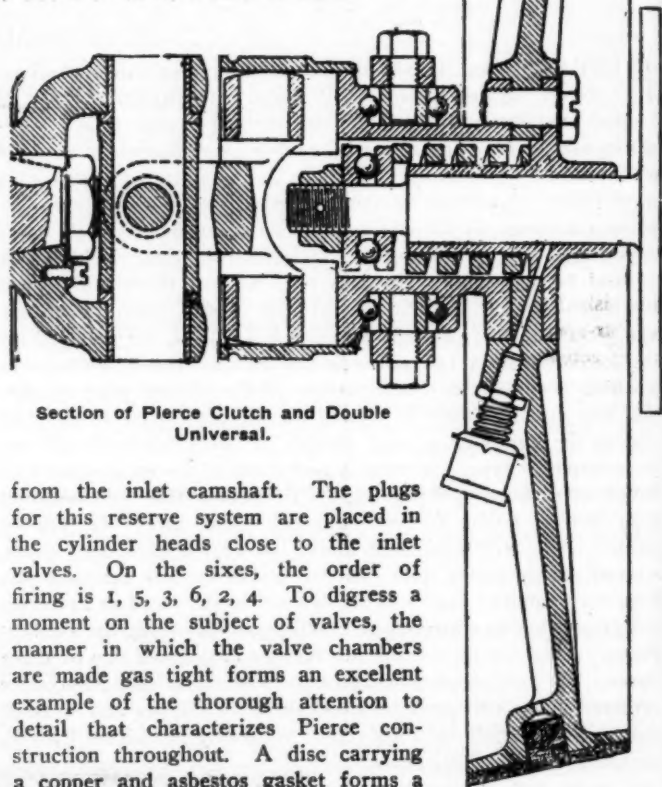
fastened at their upper ends, and are equally spaced about the walls of a circular chamber, above and to one side of the spray nozzle. These reeds are backed by springs of varying tension, against which they contact after a slight initial movement, controlled by the spring material of the reed itself. According to the demands of the motor,



Pierce Front Steering Knuckle Assembly and Connection.

these reeds uncover their respective openings in the order of their increasing spring tension and insure an exceedingly gradual and uniform addition to the air supply, thus preventing any disturbance of the mixture proportions, regardless of the suddenness of the throttle opening. The mixing chamber, placed directly over the concentric float chamber, is waterjacketed. The float valve is spring-controlled, thus maintaining a uniform supply of gasoline through the elimination of the effects of jolting. A rotary form of throttle is employed, and provision is made for supplying hot or cold air to the main intake.

A Bosch high tension magneto forms the chief stand-by for ignition, the plugs of this system being located on the sides of the cylinders and directly above the inlet valves. The secondary system consists of an Autocoil unit equipment mounted on the dash. This has for its current supply a set of accumulators, and operates through a vertically mounted roller type of timer driven by bevel gears



Section of Pierce Clutch and Double Universal.

from the inlet camshaft. The plugs for this reserve system are placed in the cylinder heads close to the inlet valves. On the sixes, the order of firing is 1, 5, 3, 6, 2, 4. To digress a moment on the subject of valves, the manner in which the valve chambers are made gas tight forms an excellent example of the thorough attention to detail that characterizes Pierce construction throughout. A disc carrying a copper and asbestos gasket forms a close fit with the recessed seat of the valve opening, but is simply dropped into position. Above this the valve cover proper is loosely threaded into the port opening. This cover, however, carries a substantial set screw, which is utilized to set the gasket home, while the tension thus produced also serves to retain the threaded cover. On releasing the set screw, the latter may be turned out by hand.

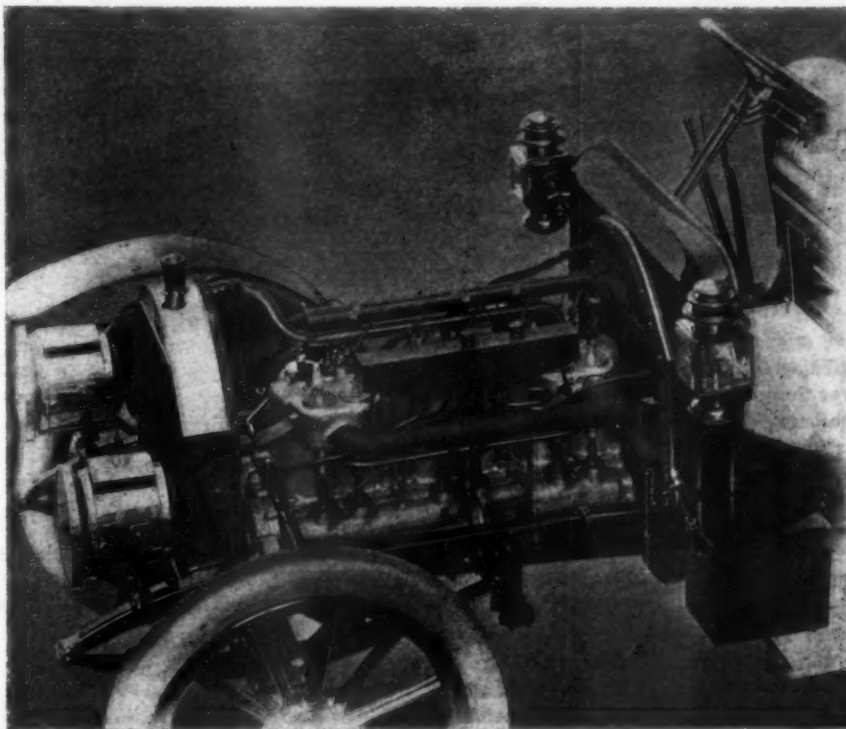
A feature of special interest is to be found in the new type of exhaust manifold recently adopted. It is a matter of common knowledge that no great amount of science has ever been lavished on this essential, though the room for improvement has been manifest. Experiment has shown that setting up an injector action in the flow of the gases from the different valve ports as they successively discharge into the manifold produced

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a partial vacuum and was responsible for a greatly improved scavenging of the cylinders. The new Pierce manifold has accordingly been designed with this end in view, and experiments at the factory show an increase of fully 5 per cent. in the power of the 48-horsepower motor over its performance when run with an entirely free exhaust. Instead of being in a single piece, the new manifold is made with a gas-tight slip joint between each pair of cylinders to prevent disalignment of the cylinder castings, owing to the excessive expansion of the usual one-piece manifold, numerous tests proving this to be fully $\frac{1}{8}$ -inch under extreme conditions, as measured in the distortion of the twin cylinder castings from their true position.

How the Power Is Handled.—Despite a more or less general tendency looking to the abandonment of the cone type of clutch in the past few years, this has been consistently adhered to in Pierce construction, and with the aid of a single row of cork inserts in the leather facing, and a carefully designed method of mounting, it has always proved exceptionally efficient and reliable, while having the further advantage of simplicity to recommend it. The spring is of the self-contained type, thus avoiding all thrust when the clutch is engaged, special ball thrust bearings being provided to take this when released. An unusually short full universal connects the clutch shaft and gear-set.

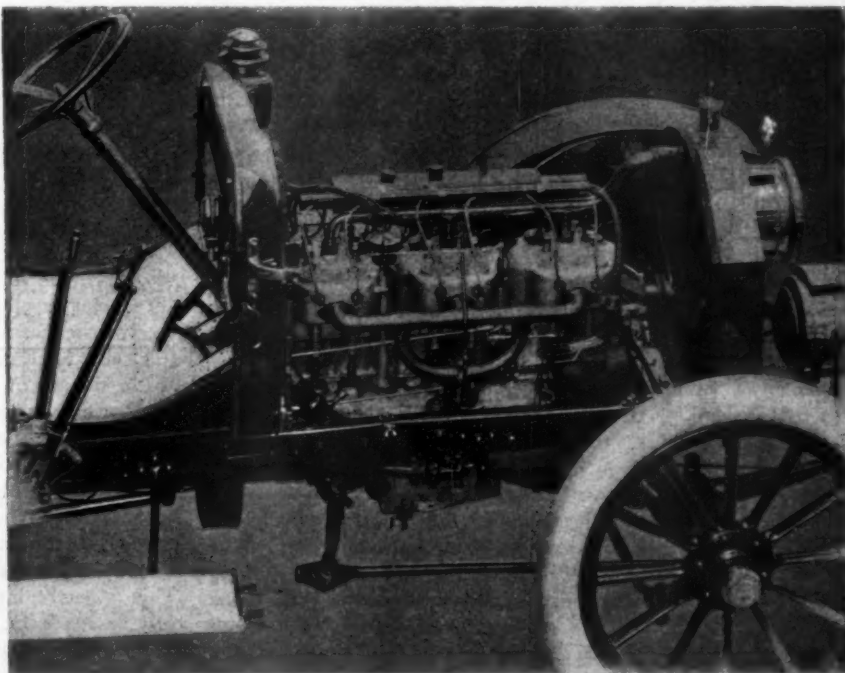
Announcement has already been made to the effect that henceforth the Pierce transmission system would no longer be distinguished by the retention of the progressive gear-set, and that a four-speed gear box operating on the selective plan with side lever actuation would be substituted, but a review of the specifications of this essential as now designed shows it to be the development of a long and careful study of the problem by Designer Fergusson. Krupp chrome nickel steel is employed for both shafts and gears, the moving members sliding on four heavy splines on the main shaft, while their corresponding pinions are bolted to flanges integral with the countershaft, thus avoiding distortion in heat-treating where integral. Both shafts are carried on Hess-Bright annular ball bearings, and the factor of safety recommended by the maker has been greatly exceeded by adopting much larger sizes than those ordinarily supplied for the same service. The usual H-gate is employed in connection with the side lever, but there are one or two features of operation that illustrate the thoroughness with which the design has been worked out. Current practice is followed in the spring-controlled ball dropping into recesses in the bars inside the housing, to determine the exact position of gear engagement, while an interlocking device consisting of a quadrant drilled with a series of holes into which a pin drops at the various engaged positions, prevents shifting without disengaging the clutch, and also serves to lock the gear-set in the neutral position. This is a feature of considerable merit, as it effectively prevents tampering with the gear-shifting lever when the car is standing unattended. It is necessary to disengage the clutch before the lever can be moved. The gear-set provides four forward speeds with the direct drive on the fourth, and the design has been developed with a view to meeting the necessities of the different models listed, thus avoiding con-



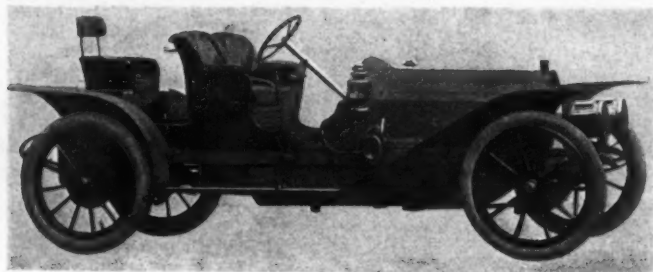
Oiler and Pump Side of the New Pierce Arrow 6-36 Model for 1909.

fusion in manufacture by making it possible to equip all with the same gearbox. The prompt handling of such a number of models has been facilitated by standardizing parts wherever this has been found possible.

Final drive is by propeller shaft, a universal being employed at each end, the rear joint also being designed to telescope longitudinally. The rear axle driving unit is carried on Hess-Bright annular ball bearings, as are also the wheels, and while a live axle is employed, it is not of the floating type, the wheels being fastened directly to the ends of the axle with Woodruff keys instead of running on the tube, as in the usual construction. The driving shafts are of Krupp chrome nickel steel, having an elastic



Illustrating the Carburetor and Magneto Side of the Same Motor.



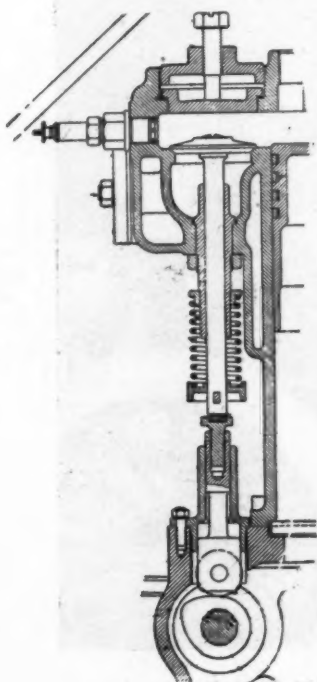
Lines of the Pierce Arrow 6-36 Three-Seater.

limit of 120,000 pounds, and are of tapered form, the increase in diameter toward the wheel end amounting to fully 25 per cent. over the inboard section. Large ball bearings are used, the inner one being mounted very close to the center line of the wheel, so that the bending moment is extremely small. This gives a somewhat lighter construction and the success of the design is manifest from the fact that in all the Pierce cars turned out none of the driving shafts have suffered from either torsion or shearing stresses. The rear hubs are drop forgings with cold drawn housings, while the front hubs are stamped complete.

Instead of attaching the triangular torsion rod of seamless steel tubing rigidly to the differential housing as previously, the points of the base of the triangle are mounted on a large pin which permits of the rod as a whole being free to swivel on it. The usual spring mounting is retained at the forward end. Another departure is to be found in the rear axle strut rod, the construction of which eliminates the use of a turnbuckle. The two halves of the rod are right and lefthand threaded and screwed into the brake hanger and differential housing respectively, lock nuts being provided at the latter point. This is almost opposite one of the holding bolts of the substantial case.

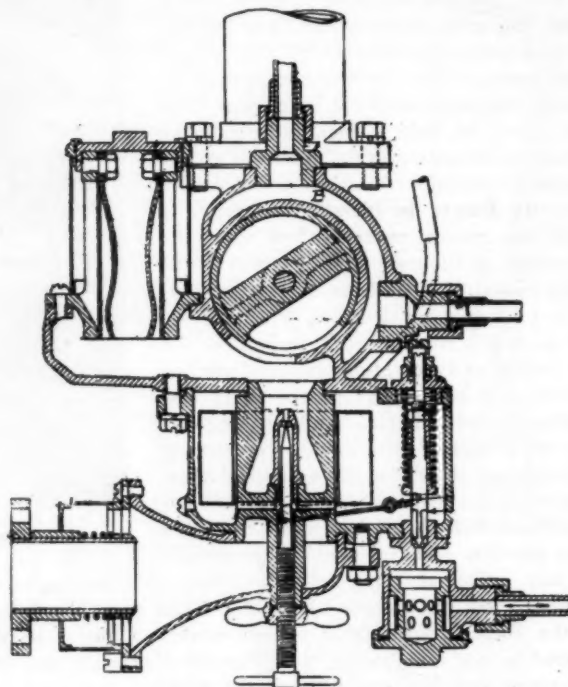
On the six-cylinder 36-horsepower model and the four-cylinder town car, three-quarter elliptic springs are used on the rear, with the usual flat, semi-elliptics front, these being used all round on the other models. Instead of bolting the leaves together, this practice causing the spring to break where drilled, two bosses are stamped up out of the center of the leaf before hardening, each pair dropping into recesses formed by the punchings in the leaf below, thus effectively preventing any end motion, without the use of a rigid fastening. In the case of both the front and rear springs a revoluble mounting on the axle is employed, with a large groove turned in the seat for oil. These saddles are drop forgings and carry an extension bracket that forms the lower attachment of the Trufault-Hartford shock absorbers, which are part of the regular equipment of all Pierce cars.

The front axle is a one-piece drop forging of simplified design, the yoke being made integral with the spindle instead of with the axle, a generous sized nickel-steel pin holding the two together and being locked in place on the axle by means of a set screw. An unusually large braking area is provided, Raybestos lining now being used in place of the bronze to steel contact formerly employed. The internal expanding or running brake is cam-operated and the emergency by direct pull, both acting on opposite faces of the same drum, and both being equalized. The emergency is not interconnected with the clutch,



Pierce Valve Assembly.

thus permitting the motor to be used as a brake, and its operation has been changed by making the lever pull up. A substantial sprag that may be instantly brought into action by the driver forms a standard part of the equipment of all the larger cars. The steering gear is of the screw and nut type, actuating a forked lever supported on a trunnion, making a practically irreversible gear, so that no road vibration is transmitted to the steering wheel. The Pierce standard tire equipment consists of



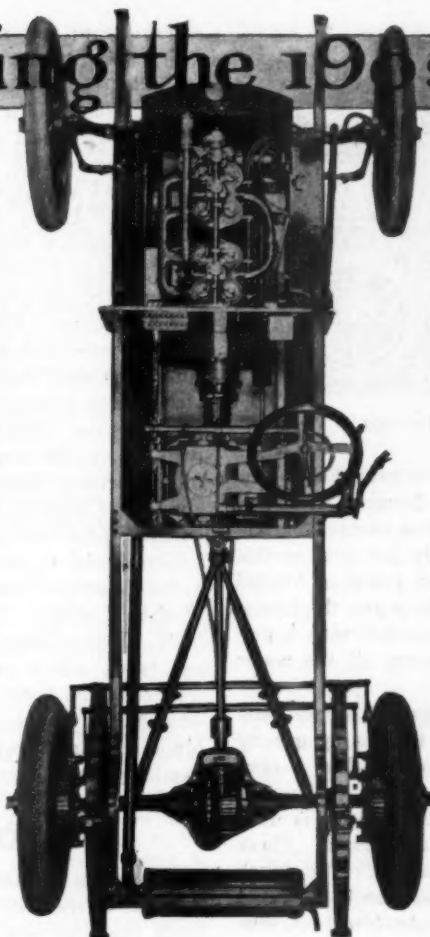
Sectional View of the Pierce Carburetor.

Goodrich quick detachables, 36 by 4 1-2 and 5 1-2-inch tires being used on the six-cylinder 60-horsepower car; 36 by 4 and 5-inch on the 48; these also being the sizes of the 40-horsepower four-cylinder model, and 34 by 4 and 4 1-2-inch on the six-cylinder 36. The wheelbase range from 112 to 135 inches.

With the exception of the features of the new Pierce cars that have been described in detail, their design and construction will be continued unaltered, and a review of the specifications of the different cars suffices to show that as a whole there has been little change, and what has been considered expedient has taken the form of improvement of the details. With the exception of the abandonment of the progressive type of change speed gearing with the operating lever directly under the steering wheel, which has been a distinctive feature of Pierce design ever since the first car of this name has been on the market, there are few points by which the 1909 Pierces could be distinguished on the road from their predecessors of the preceding year's model. Probably the most noticeable of these is the adoption of the three-quarter elliptic type of spring for the rear suspension of the two smaller models, the 4-24 and the 6-36, it not being deemed advisable to carry out this idea on the higher-powered cars owing to the danger of setting up a dangerous lateral movement of the body at high speeds, particularly when traveling over rough roads, which would be apt to bring this about even at ordinary speeds.

Starting with the five chassis as the foundations of the various models, it will be apparent that on the average no less than seven body styles will be available to the purchaser in each power, but as matter of fact this is not the case, the range where the smaller cars are concerned not being so extensive. This is partly due to the fact that only the high-powered models will be made in the seven-passenger touring types, in addition to the usual enclosed models, such as the limousine and landaulet. Some special roadster types will be turned out, such as the Pierce 6-36, three-seater, shown by one of the photos, the design being a special creation for the 36-horsepower chassis.

Describing the 1909 Moons



THE two Moon models announced for the coming season will carry out the Moon ideas advanced and proven in previous years, among which are the four-cylinder motor with overhead valves, four-speed selective transmission, multiple disc clutch, etc. Among the newer ideas which will be featured are single ignition, using a high-tension magneto with special starting device, dropped frame, the drop amounting to 3 1-2 inches, which gives a very small angle to the driving shaft. Then, too, the water jacket space is unusually liberal, the gasoline tank is removed from the dangerous position at the rear of the chassis to the more accessible one under the front seat. A cambered rear axle of the full floating type is another feature that should find favor.

The 1909 Moon is distinctly neat in appearance, and differs mechanically from the commonplace in motor, ignition and rear-axle construction. The valves are in the head of the motor and are operated by a single camshaft for intake and exhaust. Ignition is by high-tension magneto without the use of batteries or vibrators, and to facilitate starting a simple but effective spring-actuated device is used to spin the magneto armature. The rear axle is particularly distinctive, being of the arched type, permitting the rear wheels to be cambered. Two models are built for the present season, differing only in wheelbase and corresponding constructive strength. Model C has 112-inch wheelbase; Model D is the seven-seated car with a wheelbase of 121 inches. Interchangeable bodies of different types are provided.

A Preference for Full Elliptic Springs.—The frame is of 3-16-inch cold pressed steel of 4-inch and 4 1-2-inch channel cross section. The rear of the frame has an upswEEP of 3 1-2 inches, which permits the use of full elliptic springs in the rear and gives a low center of gravity without interfering with the road clearance. This has been a Moon feature for three years, and during this entire time there has never been a broken rear spring reported. A subframe carries the motor and transmission and insures perfect alignment under all conditions.

The front axle is of I-beam section drop forged steel and is located 5-8 inch in advance of the front of the radiator, which adds to the appearance of the car, as well as to the riding qualities, owing to the weight of the car being hung between the axles.

The rear axle is of the full floating type, special Moon design. It consists of heat-treated steel live axles, driving the hubs through four-fingered clutch plates. The weight is carried upon seamless steel tubing surrounding the live axles, which are in turn moulded to the steel differential housing. A 3-4-inch turn-buckle truss below axle preserves outward set. Between the differential and live axle are two small universal joints, which permit the rear wheels to be cambered at an angle of two degrees, giving an arched type of construction that is not only very strong but also is a great advantage for fast driving in that it holds the car to the road. Ball bearings are used, both in the front and rear axle.

The wheelbase of Model C has been lengthened two inches on the new model; the tread is 56 inches. On Model C, both touring

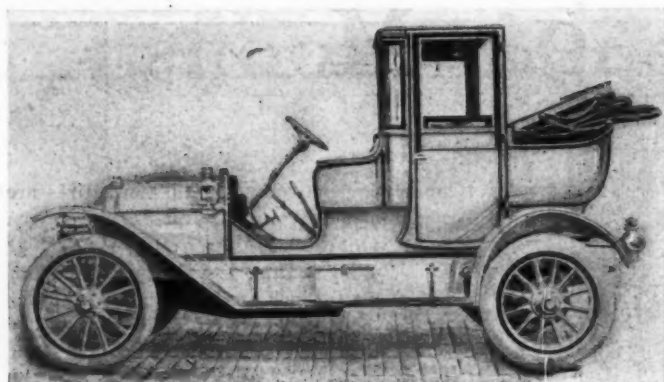
and limousine cars, 34 x 3 1-2-inch tires are used in front and 34 x 4 1-2-inch on the rear. On the roadster and all Model D types, 36 x 3 1-2-inch tires are used in front and 36 x 4 1-2-inch on the rear. Four brakes of the equalizing type, acting on the rear wheel drums, are provided. The hand lever is for the internal expanding brake, and the foot, or service brake, the outside band. Raybestos is used as lining on all brakes.

Valves in the Head Type of Motor.

A four-cylinder, 4 1-2 x 4 1-2 motor has been a Moon feature for three years, and is only modified this season by minor refinements. The cylinders cast in pairs have the valves located in the head; all valves are interchangeable. A single camshaft driven by a vertical shaft has but four cams to operate the eight valves. At 1,600 revolutions the motor develops 32.2 horsepower and is capable of very low speeds under heavy loads. The half-time gears are enclosed in an aluminum housing. A copper intake pipe leads from the carbureter, which is of the single-jet auxiliary air valve type. The carbureter is water jacketed and is placed on the opposite side from the exhaust. The cylinders are bolted to an aluminum crankcase provided with four arms, which are in turn carried on the subframe. A large water pump of the centrifugal type is gear-driven from the vertical shaft. It is placed in a horizontal position in such a manner as to be readily removable. The crankshaft is made from a single piece of alloy steel, carefully heat-treated, accurately turned and ground. It is mounted on three white bronze bearings of large size. Eccentric oilers are provided in conjunction with the crankshaft system of lubrication. The connecting rods are one-piece drop-forged steel, with phosphor white bronze bushings. They are fitted into 6 1-2-inch pistons, provided with three piston rings, centered to prevent any tendency to rotate.

Lubrication is provided by a force-feed oiler directly connected to the end of the crankshaft and mounted on the dash. Visible sight feeds are provided. The oiler is of the eight-feed type; three lead to the main motor bearings, four to the cylinders themselves and one to the lower bearing of the vertical shaft. As an auxiliary, the splash system can also be used.

Ignition Follows European Practice.—European practice is followed in the ignition system. The Bosch high-tension magneto only being used, eliminates batteries, vibrating coil, distributor and an abundance of primary and secondary wiring. Four high-tension cables lead from the magneto to the plugs, and the connections are made with a neat system of knife switches. To more than counteract any disadvantages that may be attributed to this single system of ignition, a simple but effective starting device is employed. With this it is possible to start the motor from the seat without the use of any other outside agency than the magneto itself. A very simple device is used in disengaging the magneto from its driving gear and throwing the armature of the magneto to form a contact. After the first cylinder has been fired an impetus is given to the crankshaft, and the magneto automatically drops back into gear. This is an original design and is covered by patents. A genuine honeycomb radiator is used in the cooling system. Large water chambers are provided around cylinders and valves, and water spaces as well between



Model C, Brevette Landaulet Moon for 1909.

each pair of cylinders. Large containers are provided in the cylinder heads, and these jackets extend in between the valve chambers. This method of cooling the valves insures perfect cooling of the motor at any speed. The only fan used is that which is cast in the flywheel. A circulating pump is located below the radiator, making the low part of the pump the lowest point in the entire cooling system. It is provided with a pet-cock and furnishes a simple means of draining all the water from the cylinders and the radiator.

The gasoline supply is carried in an 18-gallon copper tank located under the front seat. The gasoline flow is by gravity to the carbureter. The tank is so located that the flow is constant on the steepest grade.

Fifty-one Discs in Clutch.—A multiple-disc clutch is used consisting of 51 high carbon steel discs of special design. These operate in an oil bath enclosed in a brass housing. The clutch is provided with an automatic throw-out, which can be operated either by the foot pedal or the emergency brake lever. A universal coupling is used between the clutch and transmission. Large thrust bearings are used in connection with the releasing yoke.

The transmission is provided with four speeds forward and one reverse, and is of the selective type. The gears are enclosed in an oil-tight aluminum case, supported by four arms on the subframe. The changing gears slide on a square shaft, which is hardened and ground. The same oil which lubricates the gears lubricates the bearings. All gears are heat-treated and are cut to a six-eight pitch and are pointed by an ingenious device to insure noiseless engagement. Parsons' white bronze bearings are used. A single hand lever operates all gears through the usual "H" type of quadrant. On the gearbox proper there is a simple locking system, whereby all gears except the one being engaged are held in a neutral position. Direct drive is on the fourth speed and the final drive is through a steel propeller shaft provided with two cardan joints. These joints are of liberal size, packed in grease and enclosed in a dust-proof case.

Other General Characteristics.—The steering gear is of the double internal worm type provided with ball bearings. The

steering arm and spindle connection is located above the front axle, allowing the cross connecting rod to be located back of the axle, removing this member from any liability of contact with road obstacles. The spark and gas control levers are located on the steering wheel and operate through an inner shaft and tube within the column. A mahogany dash is equipped with a kick switch and self-starting device button, which is located beside the oiler. Heavy brass-bound cork linoleum covers the floor boards; the toe boards are inclined at an angle of 30 degrees. The running boards, made of open grating steel, besides being exceedingly rigid furnish an excellent foot scraper to keep dirt out of the car. The front fenders extend well out beyond the front wheels, and, like the rear fenders, are provided with rigid splash aprons. Both fenders and hood are of aluminum-coated steel, which insures permanent retention of the paint and finishing varnish. The muffler is carried crosswise under the rear member of the frame. This distance of the muffler from the motor insures absence of back pressure and at the same time completely silences the noise of the explosions. All bodies are constructed of aluminum, touring bodies being of convex type.

The Model C, with a wheelbase of 112 inches, is made up in a five-passenger touring car, roadster and toy tonneau, while the Model D, with a 121-inch wheelbase, carries a seven-passenger body. Both models are equipped with enclosed bodies of different types, which are interchangeable with the touring bodies. The standard color is a dark blue body with French gray running gear. The touring cars are upholstered with hand-buffed black leather, water grained. The regular equipment includes five lamps, horn, gas tank and complete tool outfit.

A NEW COMMERCIAL CAR CONCERN.

COLUMBUS, O., Dec. 14.—The Farmobile Manufacturing Company, an offshoot of the Oscar Lear Automobile Company, which holds the copyright on the name Farmobile, has just completed the fitting up of its plant at 580 Dublin avenue, and is now working on the first machines of a large order for the Pacific coast.

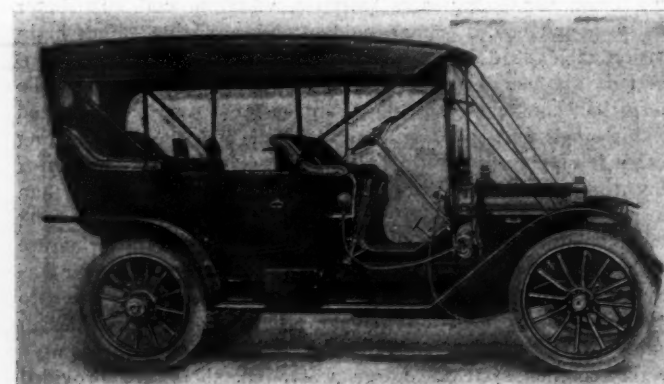
The officers of this company, which is capitalized at \$200,000, are: President, C. J. Eastman, Los Angeles, Cal.; vice-president, W. J. Miller, former vice-president and general superintendent of the Oscar Lear Automobile Company; secretary, M. W. Kounds, president of the Ohio Manufacturing Company, and treasurer, James G. Stewart. These men, with David W. Jones, compose the board of directors.

The machine manufactured is used in all kinds of agricultural work, plowing, etc., the machine doing the work of a tractor. It will be equipped, it is said, with a rotary engine. It is well known that both Frayer and Miller have been working on the rotary valve problem for many years. The factory building is new and fitted with the best of new and up-to-date machinery. It is said that an order for 1,000 machines has been received.

NEW BASIS FOR POWER WAGON SALES A HIT.

DETROIT, Dec. 14.—The new scheme for selling its motor delivery cars which the Grabowsky Power Wagon Company has inaugurated has made a hit in Detroit. The scheme in brief is a maintenance guarantee at a nominal charge, so the purchaser has only the daily use of the car, with no other responsibility or worry. Among those who have taken up with this scheme is the firm of Peter Smith & Sons, groceries. This company once before tried out motor delivery in a very thorough manner and found it unsatisfactory.

Regarding the new proposition, Henry Smith expressed himself thus: "If we did not believe in the maintenance service we would not have placed the order, as our past experience was not satisfactory. But by this plan, which is guaranteed, we cannot lose. We realize the great benefits of motor delivery, and on the basis of this maintenance contract have ordered three cars for immediate use."



Model D, Seven-Seated Moon Touring Car.

THIS YEAR GREATEST YET IN GOOD ROADS

WASHINGTON, D. C., Dec. 14.—The Secretary of Agriculture submitted his annual report to President Roosevelt to-day. It contains a great deal of information regarding the work of the office of Public Roads. Automobilists in general will be interested in the following excerpts from the report:

The Department, while endeavoring by practical demonstration and scientific experiment to improve methods of construction and maintenance, has lost no opportunity of awakening the public to a proper appreciation of the great economic importance of road improvement and the necessity for reform in the management of the public roads.

Some conception may be had of the immensity of the task by considering the fact that there are 2,151,000 miles of road in the United States, a sufficient length to encircle the globe at the equator with 86 parallel roads. The total expenditure upon the roads for 1904 was nearly \$80,000,000. At that time about 38,600 miles had been surfaced with stone, 108,200 with gravel and 6,800 with special materials, making the whole mileage of improved roads only 7.14 per cent. of the total. An effort has been made by the engineers of the Department to estimate the mileage of improved roads in 1908. Taking the 1904 figures as a basis, and assuming that the macadam roads have increased 12.5 per cent., the gravel 15 per cent., and those surfaced with special materials 25 per cent., we have 43,450 miles of macadam, 124,468 of gravel and 8,512 surfaced with special materials. The cost of the macadam has been estimated at \$4,500 per mile, of the gravel at \$1,500 and of the other surfacing materials at \$1,000. There is about 1,975,000 miles of earth road, which it is estimated has cost for grading, culverts, bridges and all other items of expense an average of \$500 per mile.

The destructive effects of automobile traffic on macadam roads have occasioned much uneasiness, as many million dollars have been expended in this form of construction. The engineers of the department have, in common with others in this country and in France and England, conducted numerous experiments with a view to determining the exact cause of the deterioration of macadam roads and of devising methods of treatment or construction which would effectually meet existing conditions. Some measure of success has attended the work thus far, and it is hoped that much progress will be made within the next few years.

The relation of the public roads to education is one which has largely been overlooked. It is a more or less well-known fact that we have in all of our States a number of illiterates. While there is a number of contributory causes to illiteracy, it is significant to note that in four States where the average percentage of improved roads is 30.35, the percentage of white illiterates is only 0.34 of 1 per cent. of the total population, and in four States, in which only 1.51 of the road mileage is improved, the per cent. of white illiterates is 4.76. It is probable that bad roads are partly a cause and partly an effect of ignorance, but it certainly appears that the two are closely related.

After describing the recent international good roads congress in Paris, and telling of the important part played in the congress by the American commission, all of which has heretofore been published in *THE AUTOMOBILE*, Secretary Wilson closes his report by saying:

"Considering the year as a whole, it is within the bounds of conservatism to say that far greater results have been accomplished than in any preceding year, and that the status of road work in general throughout the United States is more advanced and more promising for future development than in any year since the settlement of North America by the white-man."

Lincoln Memorial Highway, Washington to Gettysburg.

WASHINGTON, D. C., Dec. 12.—An active campaign has been inaugurated to secure the appropriation of sufficient money by Congress to construct a Lincoln memorial highway from the White House to the Gettysburg battlefield. A half a dozen measures with this object in view have been introduced in Congress and it is more than likely that one of them will receive favorable action before the one hundredth anniversary of Lincoln's birth in February next. Representative Lafean's bill provides that as a national tribute of affection toward Lincoln a great memorial highway not less than 150 feet wide be constructed from Washington to Gettysburg. His bill carries with it an appropriation of \$3,000,000 to carry out the project.

MINNESOTA ROAD MAKERS BUSY THIS WEEK.

MINNEAPOLIS, MINN., Dec. 14.—The first annual meeting of the Minnesota Roadmakers' Association will be held in St. Paul for three days, commencing to-morrow. All persons interested in the betterment of Minnesota's roads will attend. Boards and county commissioners, city and village councils and other public bodies will send delegations and will take part in the discussions. County surveyors, road superintendents and road overseers are showing great interest. There will be a question box, and any one interested in any phase of road work or road building may communicate with the secretary, and later there will be an open discussion of all questions submitted. The program will include also a discussion of road drainage, construction and maintenance, bridge and culvert construction and legislation.



The King and Queen of Spain Alighting from their Renault in the Palace Yard at Madrid.

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"THINGS ARE SELDOM WHAT THEY SEEM."

It is a long way from even good grades of steel to some of the fine brands that found their way into crankshaft construction some two or three years ago. The supposition was that the superior steel, with its undoubted kinetic life, would render the crankshafts capable of sustaining as long as the cars as a whole. What a shock it was when the new, and more expensive, crankshafts failed in service. Not all of them, to be sure, but so many as to indicate that the finer grades of steel could not be relied upon to abort the incidents of service which did more to give a "black eye" to automobiles than any other one thing. Crankshaft failures, in view of their cost, did not go unnoticed by the average autoist, and the high price of the alloy steel kind served as a further incentive for effort to improve.

Naturally enough, designers reached the conclusion that they could use less of a better material, and those who failed to look into the matter at some length did use a diminished amount of the superior grades of steel. Strange to relate, it was the American designers who did not dip into the tank of fallacies, due in no small measure to the fact that they merely duplicated the sizes

of their carbon steel crankshafts when they changed over to the other kind. It is not an easy thing to do without designing a new motor, this reducing the size of a crankshaft; and few were the designers that undertook the task. Abroad, where alloy steel was to be had for structural purposes, and for members in machines, designers used the same on a basis of its conventional physical properties, and less of the steel (in the section) that they naturally would have used for carbon steel all to be had.

The result was a crop of failures in high priced cars, mostly of the imported kind, so that the repair shops, of New York City in particular, were kept busy for a long time without any loss of profit to them.

It is not the idea to claim that the alloy steel crankshafts would not serve the purpose so much as it is to point out that a smaller section of the alloy steel failed to supplant carbon steel and eliminate crankshaft failures in service. As a matter of fact, the high priced alloy steel was a failure from the point of view involving a saving in quantity used, hoping thereby to compensate, in some measure, for the higher pound price of the same. In quantity sufficient, it is fairly satisfactory from the life of the crankshaft point of view, but dearly so at that, since by way of insurance the premium is high. Alloy steel in crankshafts means high first cost and high cost of replacement as well. If, then, it does not stand for long life, it fails to stand for anything tangible.



DOUBTFUL OUTLOOK FOR HIGH SPEED RACING.

It would appear that the manufacturers of Europe are about to discard high speed racing as an asset of continued value in the advance of the automobile industry. While the facts are somewhat vague, and for the moment partake of uncertainty, it begins to look as though the most substantial supporters of racing had decided to be observers rather than participants in any big speed events for next year; in fact, before anything definite is done towards the 1909 Grand Prix in France there must be a guarantee of not less than 40 entries, which guarantee, it would appear, is not likely to be forthcoming.

On this side of the Atlantic, the American maker has been a spasmodic supporter of speed contests, and the majority have come to the conclusion that it is a waste of time and money and a detriment to factory organization to supply hastily constructed racing cars for the purpose of having them defeated by the carefully built and well tried out racers of their European rivals. Savannah was an illustration of the ineffectual manner in which the Americans have contended against their foreign opponents. True, there was a success for America in this year's Vanderbilt race, but even the most ardent enthusiast is forced to admit that the field was international only in a limited sense.

The limit of speed has gone far beyond the point of sanity, and it is a question if the cost of high speed racing is compensated for by the publicity secured and the spectacular though temporary interest enlisted from the public. There is no question whatever but that contests of various kinds, such as endurance tours, economy runs, and hill climbs, are still beneficial in various parts of the country, and it would be a mistake to remove from the calendar all kinds of competitions, even though high speed events are relegated to secondary consideration.

AMERICAN MAKERS CONFER ON TARIFF REVISION

IN New York City, Saturday, December 12, the special committee known as the Automobile Manufacturers' Tariff Committee, appointed by the several associations of automobile manufacturers, held a session for the purpose of completing the brief which will be submitted to the Ways and Means Committee of the House of Representatives at Washington. Present at the meeting were the following: H. B. Joy, Packard Motor Car Company; A. L. Riker, Locomobile Company of America; E. H. Parkhurst, Peerless Motor Car Company; Benjamin Briscoe, Maxwell-Briscoe Motor Company; Alfred Reeves, general manager, A. M. C. M. A., and E. P. Chalfant, general manager, A. L. A. M.

It was reported that certain statements had been made which might tend to give a false impression as to the attitude of the automobile builders of the country toward tariff revision. In this connection Mr. Briscoe filed a copy of a telegram sent to H. E. Miles, of the National Association of Automobile Manufacturers, reading as follows:

"Knowing that an adequate duty to protect wages of American workmen, as against the existing low rate of wages in European automobile factories (which is admitted to be less than 50 per cent. of the American rate), is in practically universal demand by the American automobile manufacturers, I insist that your statement before the Ways and Means Committee implying you had information that a considerable portion of the industry was favorable to a tariff reduction on automobiles, is unfair, because it is not in accordance with the facts, and you should know it.

"I challenge you to produce any and all telegrams you referred to, substantiating your representations. I cannot believe that you would deliberately distort the facts, or that you intend purposely to convey a wrong impression, and I, therefore, await with interest a statement from you that will be supported by facts."

In an interview subsequently, Mr. Briscoe stated that it was the desire of the committee to supply all needed data that would enable the committee of congress to understand the subject thoroughly and be in a position to rule on it fairly.

"The automobile makers," said Mr. Briscoe, "have no desire to ask for an unfair rate of tariff, or for any special treatment. While the figures of wages in this country and Europe indicate that 60 per cent. duty would be necessary for adequate protection in the matter of labor, they do not ask for anything more than the existing rate of 45 per cent. As automobiles have come into use since the passage of the Dingley bill, they now come in under the classification of manufactured metals, and it is our desire to have them properly classified under the heading of automobiles and parts thereof.

"It is our belief that the tariff on automobiles should be one to protect the American workman against the low wages paid abroad. This is in accordance with the principles actuating a protective tariff, and is consistent with the doctrine of the party now in power. There can be no dispute as to the meaning of these principles and this doctrine, as set forth in the platform of the Republican party, and voiced time and again by President-elect Taft, who said 'that the Republican party is unequivocally for a revision of the tariff by a special session of Congress immediately following the inauguration of the next President,' and laid it down as 'the true principle of protection that such duties be imposed as will equal the difference between the cost of production at home and abroad.' And, moreover, 'to establish maximum and minimum rates to be administered by the President under limitations fixed by law, the maximum to be available to meet discriminations by foreign countries against American goods entering their market, and the minimum to represent the normal measure of protection at home; the aim and purpose of the Republican policy being not only to preserve, without excessive duties, that security against foreign competition to which American manufacturers, farmers and producers are entitled, but also to maintain the high standard of living of wage earners of this country, who are the direct beneficiaries of the protective system.'"

As indicating how close the foreign markets are to American trade, Mr. Briscoe pointed to the statement made by the representative of the importers when he appeared before the Ways and Means Committee, in which he stated that even a 12 per cent. reduction from the present tariff would be entirely satisfactory to the foreign makers. This statement was taken to imply that this small reduction was all that was needed to give the foreigners absolute control of the American automobile market.

There can be no contradiction of the enormous difference in wages paid in this country. "Carefully compiled figures," said Mr. Briscoe, "show that 11,400 men in American factories, and 10,347 men in European factories, received an average yearly pay as follows:

	America.	Europe.
Workmen	\$755.05	\$306.00
Commercial Employees	876.07	529.00
Technical Employees	1202.41	602.50

"This shows that the workmen in American factories are paid two and one-half times, approximately, what they get for the same work in the same kind of factories in Europe. Technical employees in the American factories receive approximately twice what they do in Europe, and commercial employees receive about one and three-fifth times what they do in Europe."

E. R. Thomas on Tariff Reduction.

BUFFALO, Dec. 14.—According to figures supplied by the E. R. Thomas Motor Company, in the year 1900 it occupied one floor of a three-story building at the corner of Broadway and Elm street, and gave employment to 60 men, including the office force. The total disbursements for that year, including the salaries of the 60 employees, material, advertising, etc., were \$40,000.

The year 1908 shows 1,400 employees, with an expenditure of \$2,315,367.14 for salaries, material, advertising, etc. The output of automobiles the first year was 75, which gradually increased until the year 1908, when the output reached the total figures of 950 complete machines.

Asked concerning a reduction in tariff, Mr. Thomas stated:

"I do not favor a reduction or increase of the tariff on foreign automobiles on account of French and Italian labor ranging from 7 cents to 10 cents per hour as against 25 cents to 35 cents per hour for American labor. The present tariff will not prohibit the importation of the surplus product of foreign manufacturers wherever they so desire. On account of the newness of the industry, out of the whole 200 manufacturers a limited number are firmly established on a profit-making basis.

"In my opinion the industry has hardly started in this country. There are 2,000,000 horse-drawn vehicles made annually in the United States, and, contrary to public opinion, over 1,200,000 of them are for transportation of individuals, and if the industry is given further opportunity for development with a comparatively few years, instead of turning out 50,000 per annum, the country will absorb 250,000 automobiles per annum, if unretarded by reduction of tariff and permitting foreigners to compete for all classes of trade. It is not the tariff, but home competition that regulates the cost to the consumer, for the reason that the foreign manufacturer charges a much higher price than the American for the same quality and character of machine."

Roller Bearings Makers on Tariff Reduction.

WASHINGTON, D. C., Dec. 12.—The Ways and Means Committee has received a number of communications during the week from manufacturers of roller bearings regarding the duty on anti-friction ball bearings. The Standard Roller Bearing Company, of Philadelphia, filed a brief protesting against any reduction in the present duty, and filed in addition a long list of American automobile manufacturers who use foreign annular ball bearings. The Timken Roller Bearing Axle Company, of Canton, O., and the Excelsior Steel Ball Company, of Buffalo, also filed lengthy briefs along the same line.

The Timken Roller Bearing Axle Company said, in part, that there are at the present time a number of factories in this country devoted exclusively, or to a large extent, to the manufacture of anti-friction bearings, including ball and roller bearings, as well as the manufacture of steel balls. This industry is comparatively new, having been carried on to any extent only during the past five or six years. The early growth of the industry was very slow, but owing to the large number of automobiles manufactured within the past few years, the business of manufacturing roller bearings has considerably increased.

The foreign makers of roller bearings have been engaged in this business for a much longer time than American manufacturers, and but for the protection of this industry afforded by the Dingley tariff law this industry would not now be in existence, as it would not have been possible to compete with the foreign manufacturer. By far the greater portion of the expense of manufacturing roller bearings is the cost of labor, a very small proportion of the entire cost being represented by the raw material going into this product. A member of the Timken organization tells of visiting a plant in France, where 2,000 hands were employed, and he found skilled labor working on machines at an average price of \$3.75 per week. On these same machines and for the same work the Timken people pay an average of \$15 per week. The present duty is 45 per cent. ad valorem, and the committee has been asked to raise this to 65 per cent.

DEATH BY TYPHOID OF JOHN B. ROWLAND.

NEW YORK, Dec. 14.—John B. Rowland, of the J. B. Rowland Advertising Agency, succumbed to typhoid fever on Saturday last, and the news of his death brought to light the fact that he was but one of a quintette of sufferers who contracted the fever at the same time, as the result of partaking of raw oysters at a dinner eaten at a New York hotel the day following election. The others were: A. B. Elliott, vice-president of the Witherbee Igniter Company, who died Thanksgiving Day; Herbert Lytle, the well-known racing driver; Louis A. Hopkins, formerly sales manager for the American Mors; and Thomas G. Wetzel, representing the Bronn-Lipe Gear Company and other interests, the latter three of whom are still suffering.

Mr. Rowland was the first to be stricken, but his case was not considered very serious, and up to within a few days of his death it was thought that he stood a fair chance of recovery. He was born in Washington, D. C., 31 years ago, and was a graduate of Georgetown University. About three years ago he entered the advertising business in this city, and made a success of it from the start.

Mr. Elliott did not show any ill effects of his experience until a fortnight after Mr. Rowland had been taken sick, but his case was considered dangerous from the very outset, and his death after a very short period of suffering did not come as a surprise to his physicians and family. Of the remaining three, Herbert Lytle is still in a hospital at Toledo, Mr. Hopkins is confined to his home in New York, and Mr. Wetzel is in a sanitarium in the same city.

Dr. Herbert L. Constable, who attended Mr. Rowland, and Dr. Belmont D. Bogart, who was Mr. Hopkins' physician, held a consultation and agreed that the fact that every one of the members of the party being taken ill at about the same time made it reasonably certain that the oysters had been infected.

NO FORD PLANT AT CAPE MAY, N. J.

DETROIT, Dec. 14.—There is no idea on the part of the Ford Motor Company to erect another plant at Cape May, N. J. Henry Ford and James Couzens recently made a 400-acre land investment at the New Jersey seashore resort, thus expressing their confidence in the future population of the "Mosquito State," which, by the way, is said to be rapidly losing its mosquito inhabitants. The land bought is north of the head of the new Cape May Harbor. The Pennsylvania Railroad is considerably interested in the development of Cape May.

POPE PRACTICALLY REORGANIZED.

HARTFORD, CONN., Dec. 12.—The reorganization of the Pope Manufacturing Company was practically completed this morning, a meeting of the stockholders having been held at the office of the company in this city. The new company is incorporated under the laws of the State of Connecticut and within a few days will acquire the property of the old organization. The Pope-Hartford motor car and Columbia and kindred bicycles will be manufactured. In about ten days the receivers of the old company will pay the fourth dividend on the approved claims, as well as interest of 6 per cent. on all debts covered by the four dividends.

The incorporators of the new company are Albert L. Pope, Colonel George Pope, Charles E. Walker and Wilbur C. Walker; thus the "old guard" remains in control. The amount of capital stock named in the incorporation papers is \$2,500,000 of preferred stock and \$4,000,000 of common stock shares at \$100 each, of which 30 shares have been subscribed for the purposes of incorporation. It is stated on good authority that the full amount of stock is practically taken.

The stockholders at this morning's meeting were the four incorporators and Lewis H. Freedman, of the law firm of Joline, Larkin & Rathbone, of New York, who, besides himself, represented Harry Bronner, August Heckscher, Frederick H. Ecker, Albert Stickney, Henry V. Poor, Arthur W. Pope, Milton Ferguson. Albert L. Pope presided. A draft of the proposed by-laws of the company was presented and adopted, after which directors were elected as follows: For one year—Harry Bronner, Frederick H. Ecker and August Heckscher; for two years—Lewis H. Freedman, Albert Stickney and A. W. Pope; for three years—Henry V. Poor, A. L. Pope and Milton Ferguson.

A meeting of the directors will be held in New York during the coming week, when the officers will be elected.

The receivers of the company have gradually sold off such of the plants and property as was not necessarily needed to successfully carry on the company's business. The Hartford factory is now running full time and the Westfield bicycle plant is busy.

INDIANAPOLIS TO HAVE MORE AUTOS.

INDIANAPOLIS, IND., Dec. 14.—After a successful experiment with automobiles in various departments during the last year, Mayor Charles A. Bookwalter and the heads of the various city departments have decided to displace horses in municipal use as rapidly as possible with motor vehicles.

The Board of Safety has just purchased a Coppock truck, to be used in the firealarm and telegraph system of the fire department and will cover the entire city in that work. An additional police patrol wagon will be purchased about January 1, making two patrol wagons, a steam touring car, a gasoline runabout and a motor cycle in use by the police.

Bids are being received by the city board of health through Dr. Eugene Buehler, secretary, for an ambulance to be used by the City Dispensary. The city has grown so rapidly that the two horse ambulance used for some years is inadequate. If this ambulance proves successful, another one will be purchased for the city hospital.

HOW THE AUTO OPENS UP COUNTRY.

ALBANY, N. Y., Dec. 14.—A movement is on foot for the opening of an automobile passenger service between Albany and Berne, or Thompson's Lake. Prominent citizens of Albany are behind the scheme, which includes the installation of several large motor buses with a capacity of twelve passengers and two tons of freight or baggage. The probable route will be from Albany to Berne over the Helderberg Mountains, touching at Warner's Lake, and returning for the present by the same route. Later, upon the completion of the Thompson's Lake road, the return route will be from Berne to the lake and then back to Albany, crossing the mountains at a different point. The whole trip will be about 50 miles in length.

EARLY WINTER DOINGS OF THE AUTO CLUBS

ANOTHER FOR NEW JERSEY ASSOCIATED CLUBS.

HACKENSACK, N. J., Dec. 14.—Realizing that it is necessary for every autoist and every automobiling organization in the State to cooperate, if the results in the way of improved legislation that every Jersey autoist is anxious for are to be brought about, the Bergen County Automobile Club unanimously decided to join the Associated Automobile Clubs of New Jersey. The club is headed by Courtlandt Linkroum, Mayor of Hackensack, and has a membership of about 60 progressive autoists, the other officers being, vice-president, George Brinkerhoff; treasurer, George W. Johnson, and secretary, Austin W. Fishbough. W. C. Crosby, J. H. Wood and George A. Post, of Paterson, and H. A. Bonnell, of Newark, State officers, attended the meeting and found the members enthusiastically in support of a universal lighting bill. It was the general consensus of opinion that a large proportion of the users of horse-drawn vehicles would favor the passing of such a law once they were shown that it involved no extra expense for them, in that every horse owner is the possessor of a lantern.

The club also placed itself on record as being against the non-reciprocal clause of the Jersey automobile law, which holds up everyone at its borders while Jersey autoists visit other States unmolested. The advisability of amending the Jersey law in this and other respects came in for considerable discussion.

DENVER CLUB WILL ATTEND CHICAGO SHOW.

DENVER, COLO., Dec. 14.—The Denver Motor Club at the annual election Monday, December 21, will vote upon the following officers: President, R. W. Smith; vice-president, William D. Nash; secretary, Frank England; treasurer, C. P. Allen; board of governors, S. D. Hopkins, J. Nicoll Vroom, W. H. Sharpley, George Tritch, E. F. Dean and R. L. Taylor.

Among the guests at the club the past week were Harry E. Field, vice-president Hartford Rubber Works; F. M. Hoblitt, sales manager American Locomotive Company, of New York; A. O. Berlitz, of Chicago, representing the Locomobile Company.

A new motor vehicle law, patterned after satisfactory Eastern laws, has been drafted for the club by Attorney Frank England and will be presented at the next meeting of the legislature.

The members of the club will charter a special car to attend the Chicago national show in February. This will leave Sunday, February 7, and return as soon as the show closes, arriving in Denver in time for the opening of the Denver show in the Auditorium, February 16. The club will conduct the show this year and will have its train to Chicago and back suitably decorated with advertising banners.

LOUISIANA LEAGUE WILL BUILD ROADS.

NEW ORLEANS, Dec. 14.—At the recent meeting of the Louisiana Motor League great enthusiasm was displayed, this manifesting itself mostly in the endorsement of new good roads projects, and particularly the so-called Chef Menteur road. The new officers were elected first. These were: President, P. M. Milner; first vice-president, Sam Weis; second vice-president, Dr. Albert Mayer; secretary, Albert Aschaffenburg; treasurer, Henry Breckinridge, and these additional directors: Capt. John Dilbert, W. P. Stewart, C. H. Ellis, Dr. M. J. Magruder, Homer George, Sam Stone and Theo. Grunewald. The new president, Mr. Milner, addressed the league briefly and emphatically on the subject of good roads, which he declared to be their greatest need.

Two of the 20 miles from New Orleans to Chef Menteur have already been started, and the league pledged itself for the remainder; \$2,400 was subscribed at the meeting and more promised. The greater source of revenue, however, will be the 500 new members at \$12 each.

CLUB WANTS SHOW; DEALERS INDIFFERENT.

BALTIMORE, Dec. 14.—The Automobile Club of Maryland has appointed a committee, headed by Dixon C. Walker, to ascertain the best time and location for an automobile show in Baltimore. The members of the club are anxious for such an exhibition which they plan to hold some time after the first of next year. They will not have the cooperation of the dealers in this undertaking from present indications. Most of those engaged in the trade express the opinion that the New York and Chicago shows are quite enough for them to see the new styles, etc.

The club members are now engaged in a membership campaign. A silver cup has been offered as a prize to the one who gets in the majority of new members by May 1, up until which time no membership fee will be charged. The club expects to have 500 names on the roll at that time, which means that two hundred more members must be gotten.

It has been decided to remain a member of the American Automobile Association. In consequence of the efforts of the national A. A. A. committee to secure a uniform road map for the entire country and to get the cooperation of Congress in passing legislation to create a signboard for universal use, the local club has discontinued the work of placing signs at various parts of the State.

"MARCONI WING" GETS A BAY STATE PRIZE.

BOSTON, Dec. 14.—The touring committee of the Bay State Automobile Association, which late in September conducted a twenty-four-hour endurance run that later developed into a week's test and resulted in a tie of three cars, has announced the award of the prize offered for the most consistent work on the part of any driver in the contest. The delay in making this award was due to the inability of the committee to obtain the votes of the observers any earlier, one observer sending in his vote from Miami, Florida. The prize, which is a gold watch, is awarded to Frank E. Wing, driver of the Marmon, who received seven votes of the nineteen that were cast. His nearest competitor was Jones, driver of the Studebaker, who received four votes. Wing drove his car through the original run without penalty and participated in the run-off, being put out of the contest after he had covered 804 miles. The work of drivers in the run-off was not considered in making the award.

GRAND RAPIDS ELECTS GOOD ROADS MAN.

GRAND RAPIDS, MICH., Dec. 14.—The election of officers of the Grand Rapids Automobile Club resulted in the election of the following: President, J. R. Jackson; first vice-president, L. C. Parmenter; second vice-president, G. L. Henzelmara; secretary, Dr. F. C. Warmshius; treasurer, Dr. Wm. Burleson, and Dr. D. E. Welsh and A. A. Barber on the board of directors. The new president is prominent in the good roads movement, vice-president of the Michigan State Automobile Association and a member of the A. A. A. Touring Board.

The club is in a prosperous condition, with a big membership and has a plan on foot for a new clubhouse to replace the loss of the Cascade clubhouse.

CHICAGO MOTOR CLUB'S ANNUAL ELECTION.

CHICAGO, Dec. 12.—At the recent election of the Chicago Motor Club the following candidates were victorious: President, F. C. Donald; first vice-president, Charles P. Root; second vice-president, David Beecroft; secretary-treasurer, Frank H. Trego; directors, H. B. Branstetter, F. C. Edwards, Paul Picard, Louis Geyler, J. V. Lawrence; auditing committee, Frank Martin, G. G. Temme and N. H. VanSicklen, Jr. President Donald in a short address disposed of all talk of a consolidation with the Chicago

Automobile Club, predicted the biggest year in membership and prestige for 1909, and promised the members an aggressive administration. The treasury has a very substantial balance.

CONNECTICUT AGREEABLE TO HIGHER DUES.

HARTFORD, CONN., Dec. 14.—The following is an extract from a letter written by C. H. Gillette, secretary of the Connecticut State Automobile Association, to F. H. Elliott, secretary of the A. A. A., under date of December 12:

"I have your letter of December 11 and regret to note that our State association has been reported as opposing the increase in dues in the A. A. A. As a matter of fact, at our last meeting of directors, held December 4, one of the directors opened an argument on this matter by questioning the increase. But the reason for it was very clearly set forth, and the board went on record as accepting the increase unanimously, and even went to the extent of passing a resolution pledging loyalty and support to the A. A. A. This resolution was the one adopted:

"Voted, That the treasurer be, and hereby is, authorized to pay, at the proper times, the dues of this association in the A. A. A. at the rate of fifty cents per year per member; and, further, that the secretary be, and hereby is, instructed to express to the president and officers of the A. A. A. the loyalty and support of this body.

"From the above you will note that the report that we are dissatisfied is entirely unwarranted, and in order to counteract any effect which the publicity of this report may have had, you are at liberty to give such publicity as you see fit to the above resolution and our confidence in the A. A. A."

PROCEEDING AGAINST MOTORPHOBE JUDGE.

POUGHKEEPSIE, N. Y., Dec. 14.—From the present appearance of the campaign which the Hudson Valley Automobile Club, of this city, backed by the New York State Automobile Association, are making against Justice of the Peace Hoppe, of Arlington, N. Y., it begins to look as if the judge will get all that is coming to him. It is said that he and his deputies have been overzealous in their arrests the past Summer, and the victims have organized, retained local and Albany counsel, and will proceed against him. It is stated further that plentiful resources are available to fight this contest out to a finish, and all persons arrested by Justice Hoppe during the past season are urged to communicate with the club secretary, E. O. Bartlett, Jr.

HARRISBURG RELIABILITY TO BE NOTABLE.

HARRISBURG, PA., Dec. 14.—It being generally understood that next year's Glidden tour will proceed westward from Chicago, the Harrisburg Motor Club will aim to make its annual reliability run the important Eastern tour of the year. This will be a four-day contest, held the first week in May, starting or finishing at Harrisburg, and visiting among other cities New York and Philadelphia.

The rules will provide for a schedule well up to the legal limit, with checking stations and observers, a technical examination at the finish, the exact number of points for each defect being specified, and in addition to these an actual tire record, which will be a contest for the tire manufacturers.

In past contests an efficient contest committee has been developed, and this tour will doubtless receive proper support, other clubs having been asked to co-operate.

ANNUAL DINNER OF THE LONG ISLAND A. C.

BROOKLYN, N. Y., Dec. 10.—The annual dinner of the Long Island Automobile Club was held to-night at the club rooms in Cumberland Street and was the most successful affair of the kind ever held by the organization. The welcome change from the customary course banquet was a beefsteak dinner, which was eaten with a hearty relish and undisguised appreciation by nearly two hundred members and guests. Charles Jerome Edwards, the retiring president, was in his usual excellent form as a toast-master and graciously gave way at the conclusion of the speech-making to the newly elected president, Frank G. Webb, who began his second term of office as the head of the club.

At the speakers' table were included Oliver A. Quayle, president of the New York State Automobile Association; Frederick H. Elliott, secretary of the A. A. A.; S. M. Butler, secretary of the Automobile Club of America; F. J. Wagner, the well-known race starter; Victor Breyer, of Paris; A. R. Pardington, general manager of the Long Island Motor Parkway, and A. G. Batchelder. These were duly introduced and made short addresses, that of Mr. Breyer being particularly well received.

Following the usual presentation of the annual cups came a vaudeville entertainment, arranged by Edwin Melvin, chairman of the house and entertainment committee. The new officials include William Schimpf as vice-president; Charles C. Cluff, treasurer, and Herbert G. Andrews, secretary.



How Long Islanders Looked as They Enjoyed Annual Banquet, Which Was a Substantial Beefsteak Dinner.

HOW DETROIT WILL BUILD 50,000 AUTOS IN 1909

By CHARLES B. HAYWARD.

DETROIT, Dec. 14.—During the first half decade of the automobile industry in this country, assuming that the industry can really be said to have existed as early as 1900, statistics would be generous in placing the total output at half a hundred thousand machines, regardless of type. Before the next twelve-month has passed, the manufacturers of Detroit alone confidently expect that they will have produced that many automobiles.

Owing to the unprecedented figures of the production planned by several of the leading makers and recently made public, a general impression has gone abroad that Detroit interests have enlisted the services of a skilled press agent and are talking "big," mainly for purposes of publication, and that the reality is bound to fall far short of the predictions. It is only natural that considerable difficulty should be found in accomplishing the task that some have set themselves—that the stretch from a few thousand to many thousand machines should present a gap that the majority will find it next to impossible to completely bridge, despite their most strenuous efforts in the line of multiple production on a basis of standardization.

Though many of the automobile surprises that have had sufficient stamina to outlive the limelight of their first uncovering at a show have emanated from Detroit, and the city has been able to lay undisputed claim to being the center of the American industry for the past three years or more, its ability to make such a jump as that contemplated naturally comes in question. How is it going to be done? Nothing but a look over the ground suffices to provide an adequate answer to the query.

According to statements published early in the season, Ford planned to turn out 25,000 cars; E-M-F, 12,000; Cadillac, 10,000; Gyroscopic, 5,000; Chalmers-Detroit, 3,000; Brush, 3,000; Regal, 2,000; Packard, 1,500, while smaller makers who fall below the thousand mark, such as the new Herreshoff, may be combined as good for an additional 1,000, and one or two makers who are to blossom forth in Detroit within the next month or so will serve to further swell the total production. Taking the above figures as those decided upon by the various makers in question, early in the season, i.e. August or September last, it will be interesting to note what effect subsequent developments have had upon them. The conclusion arrived at by those outside of Detroit would naturally be that the majority of these estimates had suffered considerably in the interim and that the evaporation of some of the surplus moisture out of them would tend to bring the total very much nearer to a point that could reasonably be regarded as nothing more than the effect of a year's healthy growth under normal conditions.

Aggregate Production Will Be Increased.

It goes without saying that some of the estimates given above have suffered to a greater or less extent; not merely because their creators put them up originally with the sole purpose in mind of knocking them down at their convenience later, but simply because circumstances entirely beyond their control have made it impossible for the men who made the calculations to carry them out to the letter. On the other hand, some of the estimates have actually been increased by substantial percentages, while in others their formulators have seen no reason to lose faith in their ability to produce the machines in sufficient numbers to uphold their predictions. One of these is Henry Ford, who firmly believes that his company will be able to turn out 25,000 of the new model Fords between January 1, 1909, and the same date, a year later. But Mr. Ford's belief is based almost wholly upon his ability to get the new Ford plant in shape by February 1 at the latest. No matter how small it is, those who have had experience along this line, know that the task of building a factory and installing the machinery in it is one that is practically never accomplished according to schedule, and when the vast dimensions of the new Ford building are taken into account, together with the tremendous amount of equipment that it neces-

sitates, it will be evident that, as is the case with most of the others, the cause of the Ford shrinkage will be delay in getting the manufacturing facilities in shape.

How the Figures and Reality Compare.

But to get back to the matter of predictions and actualities, as already realized by what Detroit's makers have accomplished in the time intervening between the publication of the above figures, the following tabular comparison of the advance estimates, and the opinion of an authority in a position to know what the various plants are capable of, makes two interesting parallel columns:

	Maker's Plans.	Estimated Production.
Ford	25,000	20,000
E-M-F	12,000	8,000
Cadillac	10,000	9,000
Blomstrom (Gyroscope)	5,000	2,500
Chalmers-Detroit	3,000	3,050
Brush	3,000	3,750
Packard	1,500	2,000
Regal	2,000	1,000
*Herreshoff	500	350

It will be noticed that in at least three instances, there are increases noted in the right hand column, instead of the shrinkage that might naturally be expected. From the dollars and cents point of view, the most substantial increase is that of the Packard, and while these conservative authorities will inform the inquirer upon application that the Packard total output will probably be in the neighborhood of 1,800, there are those who think it is far more apt to reach the figure given above. This year there are two Packards, the Packard "Thirty," and the Packard "Eighteen," though it takes a sharp eye to tell them apart, despite the smaller dimensions of the newcomer. It is expected that the Packard production will be divided between the two in about the ratio of three of the "Thirties" to two of the "Eighteens." But in attempting to set a figure on how many new Packards will see the light before the end of the automobile year, it must be borne in mind that every machine turned out must go through the same prescribed routine as if it were the sole and only end of the efforts of its creators. In other words, production is closely limited by the thorough-going methods that have made Packard a word for excellence and under such conditions production cannot be advanced, except by a disproportionate increase in the facilities for manufacture. But these are now being supplied in the shape of a large steel and concrete structure in course of erection directly across the street from the Packard administration building, and which will form a notable addition to a plant already famous for its extent and equipment. Work will be carried forward on this new building regardless of weather conditions, and its completion at an early date should provide sufficient increase in the Packard facilities to bring the figures up to those given. There appears to be little doubt that Sales-manager Waldon will need more, even at that.

The Chalmers-Detroit is another instance in which an increase is to be found, the additional fifty cars being Chalmers-Detroit "Forties"—an excess of this amount over the original estimate of 500, the remaining 2,500 comprising the output of Chalmers-Detroit "Thirties." According to Mr. Chapin, one-third of this entire output has already left the factory, from which it will be evident that there will be a further increase over the estimate, if that is possible.

One Small Car Maker to Increase.

The growth of the Brush runabout figures as shown by the two columns is to be accounted for by the fact that plans have recently been made to add 750 of the Brush delivery wagons to the 3,000 pleasure runabouts previously contemplated, and as the machine tool equipment has already been installed in the new plant and things are running full force, results will doubtless more than suffice to fulfill the predictions made.

As is the case in figuring increase of speed with added power, it must be borne in mind that twice the machinery and

*The Herreshoff estimate is based upon six months' production.

twice the number of machinists does not necessarily mean a corresponding increase in the production possible the first year. Rapid and economical production has as its basis a well-perfected organization—something that cannot be built up over night. Automobile manufacturers have doubtless placed larger orders for machine tool equipment during the past year than has any other single industry, and men are being taken on as fast as they can be assimilated, but building up a smooth-running organization takes time and meanwhile production increases slowly—a fact that accounts for some of the shrinkages to be noted in the table. Take the case of the E-M-F as an instance. Salesmanager Metzger has given up quoting exact figures. "We are going to do the very best we can," he said. "Our minimum will be close to 7,000, for we must turn out that many cars to fill our orders, and we are going to build as many more as we can."

A trip through the part now running full blast gives some idea of how the task is to be accomplished, and also affords an inkling to the initiated observer of the prodigious amount of preparatory work that was necessary to bring things to their present stage of development, as everything has been planned from the very start with an extensive production in mind. Jigs, templates and other means of accurately duplicating the production of parts with the minimum expenditure for time and labor, have been perfected, and it is easy to see that this alone has involved the outlay of a great deal of capital, all of which had to be invested long before so much as the manufacture of the smallest part of the first car was undertaken. As an instance of the manner in which multiple production is being carried out, the milling of all three faces of eight of the twin-cylinder castings at a single operation may be cited, each of the castings being clamped in a jig that renders absolute accuracy of machining possible in every case. In a similar manner, machining of such parts as the aluminum engine bed, which have hitherto required several distinct operations, usually involving the use of a different machine tool for each, is now accomplished with the aid of a single jig and a single machine. Only one who is familiar with production as carried out on a small scale, and in the manner just described, can appreciate the tremendous saving of time and expense brought about by the heavy preliminary expense for jigs, the cost of which figures down to cents per car with quantities such as are now under consideration. But the accuracy thus made possible has not been taken advantage of in the case of the E-M-F to slight finishing processes, and every E-M-F motor is run on the stand in exactly the same manner as is customary with high-priced motors, before going to the test block to be run under its own power.

Ford Production Depends Upon New Plant.

Henry Ford is always bubbling over with optimism and enthusiasm, and he says "We are going to build 25,000 Fords" with the same easy assurance that he would tell you the new car is larger and better than its predecessor. And he means it, too. If it depended entirely upon Mr. Ford's efforts, there is no doubt but that the 25,000 machines would be forthcoming in the usual course of manufacture, but there are so many things entirely beyond the control of even the most ardent hustler and so many others—outsiders of course—who are not concerned whether Ford builds 25,000 or 25, so long as their part of the contract is fulfilled, that the task is far too much for one man to be expected to get away with and still survive. But Henry Ford and James Couzens have shown what can be accomplished and it will certainly be no fault of theirs if the reality falls short of the plans. Whether it is overrating their ability to concede that they can complete a new factory, move into it and still complete 20,000 cars in a year, remains to be seen. The four-story concrete, steel and glass building measuring 75 by 885 feet is to be ready for occupancy on February 1, and work will immediately be started on the new series of 15,000—if the building contractors toe the mark—there's the hitch. Everything is to be combined under one roof in the new plant, and it is to have a capacity of 300 cars a day—more than the total yearly production of many a maker not long ago. After an interview with

Henry Ford, one expects to see automobiles as common as paving blocks upon getting out into the street, and in the vicinity of the Ford plant this expectation comes near being realized.

There can be no doubt, especially when viewed in the light of past achievements, that once the Ford organization becomes settled in its new home, Henry Ford's statement that 300 cars a day will be turned out should not fall so very far short of realization. When it is recalled that under the extremely congested conditions prevailing at the old plant, on Piquette avenue, it was possible to average 79 to 82 cars a day for weeks at a time during the rush season, and as many as 101 Ford run-about were completed and shipped in the course of a single working day, it will be seen that this prophecy is backed up by something considerably more substantial than mere opinion. Detroit's new figures of production are so startling that one immediately resorts to figuring to learn just how many cars a day must be completed to make them possible, and as 25,000 cars in a year means close to 2,100 machines a month, or practically an average of 70 complete automobiles a day for every day in the year, it will be evident that precedents are valueless.

Cadillac "Thirties" Coming Through Fast.

At the Cadillac plant, everything has been reduced to such a fine system, down to the very last detail of production, that if General Manager Henry M. Leland announced that he would build 50,000 cars in a year, anyone familiar with Cadillac methods would realize at once that the manufacture of every screw and nut necessary for that number of cars had been calculated upon long in advance and that the announcement was based entirely upon an intimate knowledge of just what the Cadillac facilities are capable of. And every one of those cars would be produced with the degree of accuracy that has made American methods of standardization in production famous the world over. There is probably no one at the head of an automobile factory in this country to-day who has a more lengthy experience in manufacturing and shop methods back of him than Mr. Leland, and there is doubtless no plant in the world where the machine tool equipment is kept so closely abreast of modern developments in this line. Instead of running a machine to a point where its value as a producer has dropped so far below modern standards as to make its immediate replacement imperative and its relegation to the scrap heap the only alternative, it is the Cadillac policy to dispose of all tools at second hand the moment their value has been depreciated by the advent of an improved type, even though the increased output be so small as to ordinarily warrant the retention of the old machine for many years. Multiple drills are prominent among the time savers in the Cadillac plant, there being one of 24 spindles, and a number of smaller sizes.

In refiguring the original estimate of 10,000 cars over, a cut of 10 per cent. was made, bringing the number of Cadillacs to be turned out down to 9,000 cars, and just how closely the production of these machines has been calculated will be evident from the manner in which deliveries have coincided with the original plans. Up to December 1, the schedule called for 300 cars, all of which left the plant by that date; from that time on the figure was 15 cars a day, and that has been averaged without variation right along. For January the production has been set at 20 cars a day, and the same figure will be adhered to during February, while for March it will be increased by 50 per cent., making the average daily production 30 cars. But by that time the capacity for producing will have been brought up to 35 cars a day, and ultimately the number turned out every working day will exceed 40 machines.

How great a force is necessary to make this possible may be gauged from the fact that at present there are 2,500 men working in the Cadillac factory in the day shift, and between four and five hundred at night, bringing the total close to 3,000 men. The night force is being added to as fast as the organization can absorb them, and by the end of the next month or two, it is planned to make the number on night work equal to half that of the normal day force, or a total of 4,000 men. This is but one plant and shows what the industry means to Detroit.

IS EUROPEAN AUTOMOBILE RACING AT AN END?

PARIS, Dec. 10.—Now that all details as to how, when, and where the 1909 races may be run, it only remains to be decided whether there shall be any races at all. The Automobile Club of France has a Grand Prix on its program for July, 1909; Italy has the intention of holding races at Bologna; Belgium is preparing for another Ardennes meet.

But constructors all over Europe are signing an agreement not to race at all. It is somewhat ludicrous that while the racing board of the A. C. F., composed entirely of French constructors, and of those constructors who are most interested in racing, should be settling such details as the number of bridges over the Anjou course or the height of the barricades, their own factories are signing a declaration against any races in 1909. From a mere group the movement has now spread to practically all the large European factories, those having promised not to race in 1909, under a penalty of 100,000 francs, comprising Panhard, Renault, Brasier, Bayard-Clement, Darracq, Peugeot, Mercedes, Benz, Itala and Fiat. No mention of this boycott of racing was made at the international meeting, notwithstanding that hundreds of interested persons are asking what will be done next year, and automobile Europe is burning to know whether this is the end of the racing game.

It is now announced that unless forty entries are obtained the Grand Prix will not be run in the Anjou district.

De Knyff Doubts if Forty Entries Are Made.

M. de Knyff, chairman of the sporting committee, is quoted as follows in the *Paris Herald*: "The situation is quite clear. All the leading houses of France do not desire to race next year, but if sufficient makers come forward before the end of the

month the sporting committee is quite willing to organize the race. Personally I very much doubt whether forty machines will be entered."

Louis Renault said: "The decision is not astonishing. The sporting committee was face to face with a simple problem and dealt with it in a simple manner. If the requisite number of machines are engaged by the end of the year the race will be held. Firms which are anxious to race have only to come forward and the contest will be arranged."

Can Change Wheels Entire Next Year.

In next year's international races there will be full liberty to change tires in any way that appeals to the driver. He may pull them over a fixed rim in the old way, he may dismount the rim and tire together, or he may take off the entire wheel, in the manner dear to S. F. Edge, providing, of course, that the wheel bearing is not interfered with. The decision has just been arrived at by the International Association of Recognized Automobile Clubs.

Resolutions were adopted which will make obligatory the use of Colonel Holden's electric timing machine in 1910. The machine, which has been in use at Brooklands track for several months, and is so sensitive that it will automatically register the passage of the front and rear wheels of a car traveling at 120 miles an hour, was brought before the International Association at its last meeting, and has since then been under observation in France. The decision was come to that where it is desired to have records recognized as international this machine must be used. It is impossible to put it into use everywhere for the coming season, and its adoption has been fixed for 1910.

FRENCH MAKERS DON'T WANT BUT MAY HAVE TO HOLD SHOW.

PARIS, Dec. 11.—A definite form has been given to the anti-show movement, and at the present moment fourteen automobile firms and two tire constructors have signed an agreement by which they guarantee to take no part in any exhibition in the city of Paris or surrounding neighborhood before May, 1910. An infringement of this rule will entail a penalty of \$10,000, to be divided equally among the firms remaining true to the agreement. The step was decided upon at a secret meeting held in Paris during the Salon, those signing the agreement being Bollee, Brasier, Charron, Bayard-Clement, Darracq, Delaunay-Belleville, Dietrich, Gladiator, Gobron Brillie, Mercedes, Panhard-Levassor, Peugeot Company and Freres, Renault Freres, and the two tire companies, Michelin and Continental.

With this document in hand a deputation from the sixteen firms are about to wait on M. Gustave Rives and urge on him not to organize a show in 1909, and in future to leave a space of not less than two years between all Parisian automobile exhibits. If the authorities refuse to accede to the request, it will be the duty of the deputation to inform them that these sixteen firms, representing the cream of the French automobile industry, will refuse to take any part in the Salon. Everything is perfectly conceived for putting an end to the annual costly Paris exhibition, all details regarding penalties and the method of exacting them being worked out in the signed agreement. The body is sufficiently imposing, too, for the only large French constructor refusing to sign the document is De Dion Bouton.

A loophole, however, has been provided, and a loophole of such dimensions that the whole group can walk through without any difficulty. A clause hidden away in the agreement stipulates that the document shall not be binding, if, after negotiations, it is found that the English constructors will not agree to abandon

their show every other year. Further, it only requires a vote of three-quarters of those having signed the agreement to annul the entire movement. The Britisher has no objection whatever to the Frenchman signing his abdication, and will doubtless have ready sympathy when the deputation brings forth its objections against costly demonstrations. But to ask John Bull to sign away a show that costs little and brings much business, that is but seven hours' journey from Paris, and that is being promoted annually with the idea of transplanting the automobile market from Paris to London—to put such a proposition does not bespeak much sagacity on the part of the Frenchmen. The only conclusion is that as soon as it is realized by the French constructor that England has no intention of going into the bankruptcy court to please even the cream of the French automobile trade, it will be necessary to burn the mysterious papers on non-participation and forget that it was ever proposed to impose a fine on the firm seeking to increase its business by means of public shows.

It is easy to understand that the whole movement has thrown the automobile world into commotion, and accessory men, small car builders and cycle dealers are anxious about the future. The cycle men have already put it on record that if the official show is not held they will organize one of their own; the accessory men are favorable to an annual exhibition, and now the voiturette constructors, who really form a class by themselves, have decided to call a meeting to consider the question.

The Automobile Club of South Africa, with headquarters at Cape Town, is a very active organization. The membership includes all the prominent autoists in Cape Colony, and the club is very energetic in improving the roads.

PRESENTATION OF GRAND PRIZE CUP.

NEW YORK, Dec. 15.—Noted Savannahians have been in New York City this week as a result of the formal presentation of the Grand Prize cup to the Fiat Automobile Company, which entered the winning car driven by Wagner. The function took place Tuesday night at the Automobile Club of America, on West Fifty-fourth street, with Mayor George W. Tiedeman, of Savannah; F. C. Battey, president of the Savannah Automobile Club; W. B. Stillwell, its treasurer, and Harvey Granger, of the race committee, among those present. In the absence of Judge E. H. Gary, Vice-President Sanderson presided. Chairman Robert Lee Morrell made the presentation speech, and E. R. Hollander responded for the Fiat company. Chairman Morrell then presented medals to Louis Strang, of the Renault, and Joe Seymour, of the Simplex, whose cars were still running when the race was officially concluded.

Prior to the presentation ceremonies, moving pictures were exhibited and explained by Orrel A. Parker, chairman of the club's entertainment committee. A supper followed.

The Savannah visitors were entertained in the afternoon by a ride over the Long Island Motor Parkway. Incidentally, Harvey Granger was so well pleased with the Lancia roadster in which he rode that he completed arrangements for its purchase with Harry Fosdick before returning to the city.

SAVANNAH ESTIMATES ITS PROFITS \$15,000.

SAVANNAH, Ga., Dec. 14.—With the Grand Prize race over more than three weeks, the officials are beginning to check the profits made from the race. Several members of the committee are out of the city, and for this reason the exact amount cannot be given out until far in the new year. The sale of tickets for the grandstand will amount to over \$18,000, while there were many tickets sold by railroads and steamship companies that have not been turned in yet.

It has been stated by some of the officials that no less than \$15,000 will be cleared from the races when all the returns have been made. This money will be turned over to the advertising of Savannah all over the country.

The last of the men who were injured while speeding in the racing cars week before last are fast rounding into condition at the Savannah Hospital. Grinnon, who was hurt in Robert Burman's No. 8 Buick, and Thompson, who was with Hugh Easter in the No. 16 Buick, are the only ones left that have not fully recovered. Both of these men sat up at the hospital for the first time Monday evening, and seem to be in cheerful spirits. Both hope to be able to leave for New York soon. Mr. Easter is still in Savannah, looking after the injured.

LIVERYMEN ARE ALIVE TO SITUATION.

CHICAGO, Dec. 14.—Straws show which way the wind blows, and, similarly, little things show the tendency of the times. Looked at in this light, small facts assume large proportions. Thus in Chicago recently a liveryman named Daute, at the head of the Lakeside Livery, operating 40 horse-drawn rigs, and in business for the past sixteen years, announced his intention of disposing of horses in favor of taxicabs. The cars employed will be of the Thomas make.

Other livery men on the South Side are rapidly falling in line. Bain, at Indiana avenue and Twenty-third street; the White Livery Company, at Forty-seventh street and Champlain, and Emery, at Twenty-fourth and Michigan avenue, are among those who have been won over. The last, Emery, is rapidly disposing of his 35 horses, and now has four Studebaker and three Thomas cars. Others will fall in line as soon as the market for horses improves, as winter is a very poor time to sell. Many of these plan to buy second-hand cars, while still others propose to purchase the chassis only, utilizing the old cab bodies. This is not a small matter, either, as many of these bodies cost \$1,000 apiece and would save the liverymen that much per car.

ADOPTS NEW RULES FOR 1909 BRIARCLIFF.

NEW YORK, Dec. 16.—According to information obtainable today, it is understood that the committee in charge has definitely adopted rules to govern the entries for the 1909 Briarcliff stock car race. The chief features of these regulations are the exacting of a minimum weight figure of 2,600 pounds, while the minimum wheelbase is to be 110 inches. Where the size of the motor is concerned, a maximum for the bore has been adopted, this being 133 mm., or the approximate equivalent of 5¼ inches, there being no limit whatever placed on the length of the stroke. The limit in this year's Grand Prix race of the A. C. F. was 155 mm.

The special committee of ten appointed to manage the race held meetings on Monday and Tuesday, and it is understood that the foregoing represents the result of their consideration of the subject. This committee is headed by C. F. Wyckoff, of Wyckoff, Church & Partridge; the remaining members being Paul Lacroix, of the Renault Freres selling agency; H. A. Lozier, Lozier Motor Car Company; Harry S. Houghton, Harry S. Houghton Company; E. R. Hollander, Fiat Automobile Company; C. H. Tangeman, the Hol-Tan Company; Claire Hamilton, the Isotta Import Company; Walter Allen, the De Dietrich Import Company; H. U. Palmer, of the Palmer & Singer Manufacturing Company, and Percy Owen, of the Carl H. Page Company.

SHOW COMMITTEE ENTERTAINS GARDEN STAFF.

At a Hotel Breslin luncheon, Tuesday last, the show committee of the Association of Licensed Automobile Manufacturers was host to the staff of Madison Square Garden. This included James C. Young, secretary of the Garden company; T. J. Reynolds, superintendent; C. M. Schroeder, business manager; Antoni Pelligrini, in charge of the ticket selling; J. S. Stewart, electrician; W. J. Paxson, chief engineer; and a dozen more in charge of various departments, as follows: P. Christenson, F. Froelich, W. Schroeder, F. W. Fenn, W. J. Brennan, D. S. Houghton, J. Ostrander, Enos Josephs, Charles Specht, J. Smith, M. J. Pike, T. Jones, G. Fisher, J. A. Smith and J. Weil.

These men are only departmental heads, each having a staff of greater or lesser proportions under him. The perfection of the organization was revealed when the men talked about their work in connection with the show, and the suggestion was impressive that it must require a great deal of money to keep the machinery of such an organization running smoothly. E. P. Chalfant, general manager of the Licensed Association, presided at the luncheon, and others present besides those named were: Merle L. Downs, Coker F. Clarkson, Arthur N. Jervis, Montgomery Hallowell, W. W. Knowles, S. R. Ball, J. M. Carples, W. H. McDonald, H. M. Stevens, F. M. Stevens, A. F. Stevens, William Yeager and Charles H. Gresslee.

A NEW YORK CORONER SUGGESTS SPEED LAW.

NEW YORK, Dec. 14.—One of the best jokes sprung lately is the suggestion of the coroner who probably thinks to reduce his own work by this method. He suggested, and had Alderman Levine introduce, two ordinances, one to limit the speed of automobiles in the city to six miles per hour, and the other the speed at crossings and turns to one-third the legal limit, which would figure out to two miles per hour. At these rates of speed people might as well walk and the automobile would die a natural death. Perhaps that is what the coroner wants.

AND WHEELING WILL HAVE TAXICABS.

WHEELING, W. Va., Dec. 14.—Not to be outdone by larger cities, Wheeling will have a taxicab service before the close of the year. A party of local business men interested in automobiles have formed a strong company and will at once put a couple of cars into service, others being added at short intervals as the service warrants.

POOR ROADS RETARD SELLING IN SOUTH.

CHICAGO, Dec. 14.—Among the large party of business men from Chicago which recently toured the South was W. Hildreth. Upon their return addresses were made before the Chicago Association of Commerce, and Mr. Hildreth, who is vice-president and manager of the Holsman Automobile Company, was among those who spoke. Being an automobile manufacturer, naturally his talk was mostly along the lines of automobiles and good roads. He found that the most universal obstacle to the auto in the South was the poor roads. Lack of prosperity was urged as a cause of backwardness in the use of motor cars, but Mr. Hildreth learned that this was not wholly true. Thus, the cities visited have shown a greater advancement in the past eight years than in any previous decade. Another fact was that where roads were good, machines were plentiful, and in the region of bad roads they were as scarce as the proverbial hen's teeth.

As a result of this trip he advised manufacturers that the only immediate and profitable market at present lay in the sections having good roads, and that money or energy spent elsewhere would be wasted. However, he advocated a campaign of education in the poor road districts as a source of future sales.

NEWS MADE IN GERMANY.

BERLIN, Dec. 8.—There is huge activity in aeroplaning circles in Germany, and besides all the apparatus known of, news of three new additions to their ranks has just come to hand. The military authorities are building the third airship under Major Parseval's guidance, while the Airship Battalion is about to start work on an entirely new system of aeroplanes, designed by Major von Gross, which is said to differ from all others. Added to this is the information that despite all denials, the electrical firm of Siemens-Schuckert has commenced carrying out tests with a new aeroplane of which great things are promised. Germany fully determines to be in the very front ranks.

Heated motor taximeters are being run on the streets of Berlin and are cutting out their chillier rivals to such an extent that all the cab-owners are thinking of fitting up their vehicles in a like fashion.

E. H. Gary, president of the Automobile Club of America, has been made an honorary member of the Imperial Automobile Club, Berlin, while its new women members include Mrs. O. S. Kerr, of New York, and Mrs. James Deering, Chicago.

MANUFACTURERS TRY OUT NEW TIRES.

NEW YORK, Dec. 14.—The marked progress being made by the tire manufacturers in the improvement of their product is well illustrated by a recital of the methods employed for testing out new models. Thus J. M. Gilbert and James Patterson, of the Continental Caoutchouc Company, of this city, left on December 12 on a trip to Buffalo and return, which will exceed 1,000 miles, for the purpose of testing out the new TC and AC flat tread tires. They drove a Lozier Briarcliff model equipped with these tires and measuring instruments for testing the heat created at various speeds, the expansion of the tires under service, the amount of air lost by road contact and other technical weaknesses.

OLDS AND A. L. A. M. PART COMPANY.

NEW YORK, Dec. 14.—The Olds Motor Works, of Lansing, Mich., and the A. L. A. M. have finally severed all connections. At the recent meeting of the A. L. A. M. board of managers the matter came up for discussion and was finally disposed of with the above result. The outcome will bring about some complications. One immediate result will be to involve agents who handle licensed cars in addition to the Olds. The Greene Motor Car Company, of Newark, N. J., for instance, has for this reason given up their Oldsmobile agency and will devote themselves exclusively to the Locomobile. The New York Olds agents will take care of this territory until a new agency is opened.

TO DISCOURAGE "TOURING" ACROSS CANADA.

SANDWICH, Ont., Dec. 14.—The Essex County Council has adopted a resolution asking the Ontario Legislature for an act permitting each county to regulate and license automobile traffic through its territory. This action is directed particularly against automobilists from outside passing through Essex County, and especially those touring from Detroit to Buffalo, many of whom have made nuisances of themselves.

As first introduced by Warden O'Neil, the resolution asked authority to charge a license fee of \$25 on each automobile passing through the county. It was pointed out that, if adopted in each county, say between Detroit and Niagara River, this would make touring prohibitive, and the cost between Detroit and Buffalo would be about \$300 in license fees. The resolution was finally adopted without naming a specific amount.

SPOERER CARS LATEST IN BALTIMORE.

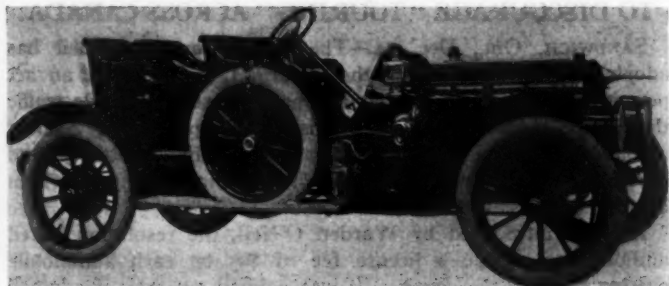
BALTIMORE, Dec. 14.—Spoerer cars are the latest to be made in Baltimore. The firm making these cars is the Carl Spoerer's Sons Company, which has just recently entered the manufacturing business. The firm is making at present a four-cylinder car of two models, a tourabout and a 5 or 7-passenger Pullman body car. The car has not as yet been placed on the market, being put through a severe test on the local streets. The firm also contemplates manufacturing automobile trucks and automobile engines within the next year.

THE AUTOMOBILE CALENDAR.**AMERICAN.****Shows and Meetings.**

- Dec. 31-Jan. 7.—New York City, Grand Central Palace, Ninth Annual Automobile Show, conducted by the American Motor Car Manufacturers' Association, with Exhibits by the Importers' Automobile Salon, Inc., Alfred Reeves, General Manager, 29 West 42d St.
- Jan. 5.—New York City, Fourth Annual Meeting Society of Automobile Engineers. (Will adjourn until January 19 after opening session.)
- Jan. 16-23.—New York City, Madison Square Garden, Ninth Annual National Show of the Association of Licensed Automobile Manufacturers. M. L. Downs, Secretary, 7 West 42d St., New York City.
- Jan. 27-Feb. 3.—Philadelphia, Second Regiment Armory, Eighth Annual Show, Philadelphia Automobile Trade Association.
- Feb. 6-13.—Chicago Coliseum and First Regiment Armory, Eighth Annual National Exhibition, National Association of Automobile Manufacturers. S. A. Miles, Manager, 7 East 42d St., New York
- Feb. 15-20.—St. Louis, New Coliseum Building, Third Annual Show, St. Louis Automobile Manufacturers' and Dealers' Association. Lloyd Rickert, Manager.
- Feb. 15-20.—Detroit, Wayne Pavilion, Annual Show, Detroit Automobile Dealers' Association. E. LeRoy Pelletier, Manager.
- Feb. 15-20.—Cleveland, First Regiment Armory, Annual Show, Cleveland Automobile Dealers' Company.
- Feb. 16-18.—Denver, Col., Auditorium, First Annual Automobile Show, Denver Motor Club.
- Feb. 18-25.—Toronto, St. Lawrence Arena, Third Annual National Automobile, Motor Boat and Sportsmen's Exhibition. Ontario Motor League. R. M. Jaffray, Manager.
- Mar. 1-6.—Buffalo, Convention Hall, Seventh Annual Automobile Show. Buffalo Automobile Trade Association.
- Mar. 6-13.—Boston, Mechanics Building, Seventh Annual Automobile Show, Boston Automobile Dealers' Association. Chester I. Campbell, Manager, 5 Park Square.
- Mar. 27-Apr. 3.—Pittsburg, Duquesne Garden, Automobile Show, Pittsburg Automobile Dealers' Association.

Races, Hill-Climbs, Etc.

- Jan. 1-2.—Philadelphia, Two-day New Year's Run of the Quaker City Motor Club.



New Four-Passenger 45-Horsepower Rambler for 1909.

THE LATEST RAMBLER MODEL.

A new Rambler model just announced by Thomas B. Jeffery & Company, which will be first shown and demonstrated at the New York branch, 38-40 West Sixty-second street, during the period of the New York automobile shows, is a 45-horsepower car with four-passenger or close coupled body and Rambler spare wheel as a part of the equipment.

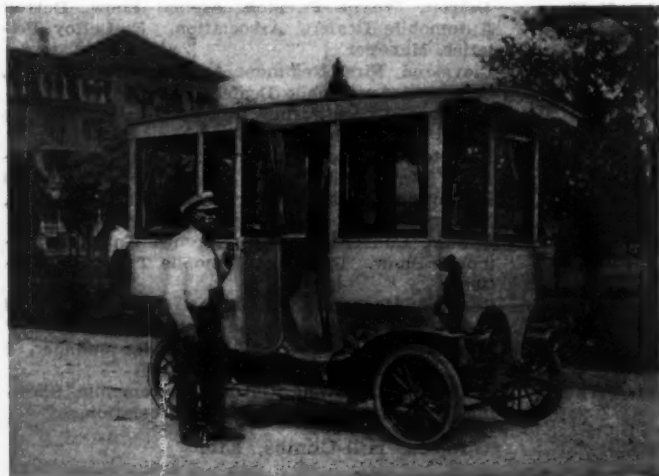
Its lines are quite exclusive, as is also the color combination—dark Brewster green, black effect, striped in orange, with orange wheels. The spare wheel, locked on the side, adds individuality. The upholstery is highly finished smooth leather which contrasts strongly with the bright orange of the wheels. In short, this Rambler is just a little different from any other car and to use a slang term, it is quite entitled to be described as "sporty." That the combination of a very light four-passenger body of this type with the 45-horsepower Rambler chassis is both unusually speedy and powerful scarcely calls for mention, as that fact is quite evident upon a glance at the above picture.

A HOUSEBOAT ON WHEELS.

One of the newest things in convertible bodies is that built by a Florida man, N. H. La Grand, of Jacksonville. This is in substance a houseboat on a Franklin chassis. The houseboat part of the outfit La Grand built himself, taking half of each day from his business to work on it. Working at it thus he took fifteen months to build it and spent \$3,700.

This strange vehicle is used by the owner, both as a place of business and a residence, the interior, of mahogany, being so arranged that it may in less than a minute be converted to a working, a dining, a sleeping or a touring car. Despite this the car weighs but 2,300 pounds and is very fast.

The Sharp Edge, as La Grand calls it, thus indicating his business, a dealer in razors, has plate glass windows, silk curtains, electric lights and other modern conveniences that one would not expect to find in a home-made product of this sort. The cut shows this unusual body.



"The Sharp Edge"—A Florida Man's Practical Idea.

NEW ONE-TON TRUCK MAKES APPEARANCE.

BUFFALO, Dec. 14.—To meet the requirements for a truck lighter than their three-ton machine, the Autocar Equipment Company, of Buffalo, builders of commercial vehicles exclusively, have brought out the one-ton truck, of which the cut shows one of the six delivered to a transportation company. This follows standard light truck lines in having the motor forward under a bonnet, selective type of transmission, chain drive, etc. The motor is a four-cylinder 25-horsepower unit, with individually cast cylinders, and is an excellent piece of work. Transmission of power then is to a sliding gear transmission, giving three speeds and reverse. The final drive is by double roller chain (Baldwin) from sprockets on the jackshaft to the rear wheels. The latter are fitted with large internal expanding emergency brakes, operating on the toggle principle and lined with hard fiber. The service brakes are of the band type and work on a pair of brake drums located on the jackshaft.

The wheels are of the artillery type of seasoned second growth hickory, with 14 1 3-4 spokes, and are equipped with 36 by 3 1-2 inch solid rubber tires all around. These wheels run on plain bearings on the axles, which are both of the square section forged steel, 1 3-4 by 1 3-4 inches. The springs are of the best quality



New One-Ton Truck of the Auto Car Equipment Company.

of spring steel, 2 1-2 inches wide, with 1-4-inch leaves, the number varying for front and rear, according to the load to be carried.

This firm is one of the few committed to the armored wood frame. They use on this car ash sills 1 3-4 inches thick by 5 inches high, reinforced by a 3-16-inch plate of sheet steel on the outside. This frame is narrowed at the front to take the engine without a sub-frame and also to increase the steering lock. The steering is accomplished by means of an irreversible steering gear of the worm and sector type, with wood steering wheel on an aluminum spider. This carries also the spark and throttle control levers.

A gear pump circulates the water through the cooling system, the principal feature of which is a square tube honeycomb type of radiator. Ignition is by jump spark, two sources of current being provided, storage battery and dry cells. A roller type of timer is used.

The body, painting and trimming vary with each job, the car shown having a comparatively small body, about 4 feet by 8 feet, back of the driver, and being painted very plainly in black, with a dark green stripe and light running gear. The tailboard as shown is hinged and may be used to carry stuff, or it may be made removable for hauling lengthy merchandise. The car is fitted with storm curtains of a heavy black duck.

This firm also has under construction a lighter car of a capacity of 1,000 pounds, which will follow along the same general lines as the one just described. The details of this car are not yet available, though it is stated that a light gasoline motor will form the power plant.



How a Philadelphia Merchant Used His Elmore to Cut Fodder.

Frank Hardart, of Horn & Hardart, Philadelphia, has put into practical use an idea that occurred to him when he needed some fodder cut on his farm a few miles outside the city. He backed up his Elmore into position in line with the fodder cutter, jacked up one of the rear wheels, and ran a belt from it to the pulley on the cutter. The work required to get the machine into operation was practically nothing and the result all that could possibly be desired by the experimenter.

Ran a Steamer Cheaply.—A letter from Leon T. Bunnell, of Terryville, Conn., gives some figures for running a steamer which figure out very advantageously to that form of motive power. Mr. Bunnell with a Locomobile steam runabout, having a special 14-inch kerosene burner (F. W. Ofeldt & Sons, manufacturers), ran 4,500 miles last Summer at a total expense as follows:

Fuel—250 gallons kerosene at 9c....	\$22.50
Repairs	25.00
Tires, oil, waste, etc.....	60.00
	\$107.50

This figures out an average cost per mile of 2.4 cents. As nearly all of this driving was over New England hills, some very steep and rough, with two passengers all of the time and sometimes three, this is an excellent record. The mileage it will be noticed works out to 18 miles per gallon, which is another record that will stand a whole lot of beating.

Many Packard Tours Abroad.—The past has been a lean year for the hotel men and others in France who make their living off the tourists. For this reason the Frenchmen feel kindly towards the Packard car, as more owners of these cars have toured the Continent than any other this season, no fewer than 175 Packard parties having been registered at the Paris headquarters. Consequently, the well known slogan, "Ask the man who owns one," translated "*Interrogez l'homme qui en possède*," has become equally familiar over there. These tours have ranged from 2,000 to 8,000 miles over all the popular and some unusual routes. But even as a result of these long tours, the repair shop affiliated with the Paris office has complained that they did not get any work to do, for there was no need of repairs. From this, the Frenchman in charge, L. Bousquet, draws the interesting conclusion that they must be well built.

New Lease of Life.—The Auto Parts Mfg. Co., of Muncie, Ind., formerly the Muncie Auto Parts Company, has bought a number of new patents for automobile parts which have never been included in a manufacturer's list before. The plant has been overhauled thoroughly, a number of new machines installed, and a lot of workmen added to the already large force. The original company was one of Muncie's infant industries, and at one time the big plant on South Elliott street,

north of the L. E. and W. R. R., was operated day and night. A new lease of life, with an infusion of new blood, among whom is Dave Henry, sales manager, will undoubtedly revive this once flourishing concern.

A Bold Robbery in the Metropolis.—T. P. C. Forbes, Jr., of 1657 Broadway, New York City, is mourning the loss of his 40-horsepower American roadster, which was stolen from the curb at Sixth avenue and Thirty-eighth street last Friday. The car had the regular underhung body and was painted a dark Brewster green. The number on the engine is 402, and the license tag 48,578. The car had 36-inch wheels with 4-inch rear tires and 3½-inch tires on the front. At the rear of the car the tire holder was fastened on the trunk rack. Mr. Forbes would appreciate the receipt of any information regarding the whereabouts of the car.

Auto Makes Progress in Far West.—A story from Fresno, Cal., vouched for as true, tells that in one of the local agencies a bunch of salesmen were sitting around smoking when a sheep inspector with more whiskers than most anything else blew up in a one-lunger Cadillac and asked to have lamps and generator put on right away. He was politely told that on account of the pressure of work it couldn't be done.

"Well, what am I going to do," he inquired, "I've got to tend to my business." Some one suggested hiring a horse and buggy. "Oh —" said the disgruntled sheep inspector, "I can't depend on a horse." Just for that they fixed him up.

Had to Build an Addition.—The New Process Raw Hide Company, Syracuse, N. Y., after operating its plant nights for several months and having the largest payroll in its history, has been obliged to build a large addition to its present factory. This will be a modern steel construction with cement floors, two stories and basement, 60 by 80, adding 14,000 square feet of floor space to the east end of the present factory. They have contracted for some \$12,000 worth of new machinery, principally automatic machines, gear planes, and grinders. A hardening furnace for transmission and driving gears will be one of the features. It is expected that the new building will be ready for occupancy by February 1 or thereabouts.

Harriman's Faith in Motor Cars.—As an instance of the belief of E. H. Harriman in gasoline or other liquid fuel for railroad use, it may be noted that within the coming months he will spend a small fortune in experiments at the Omaha, Neb., motor car shops. He expects to excel in speed and economy of operation anything that has yet been produced. What this will result in is hard to say, for M. C. No. 8 has a 6-cylinder 12 by 14-inch motor, rated at 230-horsepower and travels at a speed of 65 miles on .45 gallon of gasoline per mile, carrying 75 passengers.

Many Motor Patrol Wagons.—Not to be outdone by the larger cities, like Chicago, which has just received its third motor-patrol wagon and ordered number four, the town of Richmond, Va., has ordered a patrol wagon. The contract was recently awarded to the American Locomotive Company. The decision to have the motor-propelled rig, made after due deliberation by a body of conservative men, shows plainly that the commercial vehicle is gaining advocates daily, purely on its merits.

Matheson Increases Capital.—The Matheson Automobile Company, of Wilkes-Barre, Pa., announce that they have recently increased their working capital by \$350,000, thus enabling it to more than double the previous factory output. By thus increasing production, the concern is able to make the astonishing cut of \$1,000 in the price of their 50-horsepower car and to do this without any sacrifice in the quality. The guarantee for one year will be continued, despite this great reduction.

Actors Beating the Pullman Company.—The Walter Hale Company, now on tour with "The Wolf," are trying a new stunt of going from city to city by automobiles. After playing in New Haven, Conn., recently, they made the trip to Poughkeepsie, N. Y., in four hours in a 40-horsepower Studebaker. The trunks, scenery, and lesser lights traveled by railroad, while the leading players made their own schedules and beat the poor Pullman Company out of their hard-earned cash.

Grout Behaved Perfectly.—W. J. Gould, sales manager of the Grout Automobile Company, Orange, Mass., has just returned from a demonstrating trip with the 1909 model of shaft-drive car, calling on the several agents from Boston to Philadelphia, covering in all, including demonstrations, 2,200 miles. The car behaved so perfectly that every agent called upon placed his contract for 1909, requiring the hiring of more help at the factory.

Price of the Corbin Baby Tonneau.—In stating the prices of the new Corbin models for 1909 in connection with the description given of this car in THE AUTOMOBILE, December 10, it was made to appear that all three listed at the same figure, i.e., \$2,500. While this is true of the touring car and the roadster type, the price of the baby tonneau model should have been given as \$2,650.

Professional Automobile Engineers Elect.—At the recent annual election in New York City of the Society of Professional Automobile Engineers, these officers were elected: President, Ed. Traphagen; first vice-president, Robert J. Dobson; second vice-president, John McClarity; secretary, George Strobbridge; treasurer, Eugene Nassoy; chairman examining board, Otto Zinamerellis.

Fire Chiefs Will Use White Steamers.—Two White Steamers will be used by Chief Horton and his deputy of the Baltimore fire department in responding to fires, according to specifications just given out.

The department will also be provided with two ambulances, one to hurry injured firemen to the hospitals and the other to remove injured horses to a veterinarian.

Airships.—The American representative of the Clement-Bayard, Sidney B. Bowman, has just returned from Europe and has announced that the Automobile Company has gone into the commercial manufacture of airships. The S. B. Bowman Company will act as the foreign agent for these airships, and, in fact, is now promising delivery in three months.

Baltimore to Have Locomobile Police Patrol.—A 60-horsepower Locomobile police patrol has been ordered for the Baltimore Police Department from Callahan, Atkinson & Company, agents for the Locomobile. The car will cost \$5,500 and have a seating capacity for 12. It will be used in the Central district, and a garage will be built for its storage.

Maxwell Dealers to Meet at New York.—The annual convention of Maxwell dealers, a regular institution in connection with the A. M. C. M. A. show, will be held Tuesday, January 5, at the Hotel Manhattan. The most important item in the discussions will be the new and unusual sales organization, inaugurated by Benjamin Briscoe.

A Question of Accuracy.—The accuracy of the automobile to-day and the interchangeability of its parts are directly due to the use of fine tools. As a sample, it might be noted that the Cadillac Motor Car Company have just placed an order with Brown & Sharpe for \$6,000 worth of snap gauges, a total of 1,500 of them being required.

Not a Moment's Trouble.—F. M. Sinclair, of Schenley, Pa., after driving a Winton "six" 8,000 miles, says: "I have not touched anything under the bonnet, and have had no trouble with engine or ignition. The engine has not missed once, and the original spark plugs are still untouched."

Another Girl in the Auto Business.—The Ajax-Grieb Rubber Company, of Trenton, N. J., are sending out to the trade a handsome large lithographic hanger. This represents another of the Ajax girls and is the prettiest one of the bunch.

IN AND ABOUT THE AGENCIES.

Locomobile's New Boston Home.—The Locomobile Company of America, which was obliged to vacate its branch house and garage at 400 Newbury street because of a court order, has established new Boston headquarters at 589 Boylston street in Copley square, and there K. M. Blake, the Boston manager, will be found for the present. The new salesroom is in an excellent location. The reason for giving up the new garage and salesrooms on Newbury street was because adjoining land owners secured judgment against the owner of the garage on their claim that in building such a structure the owner violated restrictions upon the land.

Franklin, Philadelphia.—Since the Automobile Sales Corporation succeeded the Quaker City Automobile Company some months ago, former agents of the Franklin, that car has been unrepresented in the Quaker City. A deal was put through last week whereby James Sweeten, Jr., and H. G. Clark, under the firm name of the Franklin Motor Car Company, will handle the Franklin in the Philadelphia district, with temporary quarters at Thirty-seventh and Spruce streets, opposite the University of Pennsylvania. Ground will be broken

for a permanent steel-and-concrete building at Thirty-fourth and Chestnut streets within a few weeks.

Some New Franklin Agencies.—The Franklin Mfg. Company will be represented in the following cities in 1909, in addition to others previously mentioned: Bloomsburg, Pa., C. W. Funston; Lancaster, Pa., Lancaster Auto Company; Geneva, N. Y., Geneva Automobile Company; New Haven, Conn., Holcomb Company; Bridgeport, Conn., Blue Ribbon Garage, 283 Fairfield avenue; Canton, O., Diebold Motor Car Company; Washington, D. C., Cook & Stoddard Company; Waterloo, Ia., Moore Auto Company; Jamestown, N. D., Lenz-Land & Loan Company; Salt Lake City, Utah, Consolidated Wagon & Machine Company.

Great Western, Peru, Ind.—The Model Automobile Company, of Peru, Ind., manufacturers of the Great Western car, has secured a number of new agencies for 1909, among whom one is made prominent by her sex; viz., Mary E. Carlton, who will handle this car in Rochester, N. Y. The others are all "mere" men as follows: Alden, N. Y., Bennet Manufacturing Company; Newfane, N. Y., W. H. Collins; Freeport, Ill., William Ott; Waterloo, Ia., A. Burhyte; Kansas City, Mo., B. L. Colaw; Goltry, Okla., J. H. Santee; Calgary, Alberta, Canada, T. H. Graswick.

Benz, America.—The Benz car, that famous product of the Benz Company, at Mannheim, Germany, which has produced such a stir lately, will be actively pushed in America from now on. The exclusive agency and sole sales right has been given to Jesse Froehlich, known in the trade as managing director and treasurer of the Times Square Automobile Company, of New York and Chicago. Mr. Froehlich now has the Benz racer driven at Savannah by Hemery on exhibition at the salesroom, 1599 Broadway, New York City.

Mitchell, Jacksonville, Fla.—This town is very much elated over the rumor that the Mitchell Motor Car Company, of Racine, Wis., will soon establish a distributing house here to supply all of the Southeastern territory, as well as the West Indies. This rumor was started by the trip of J. Mitchell Lewis, president, and J. W. Gilson, sales manager, to Jacksonville upon the completion of the week of racing at Savannah.

Post & Lester, Boston.—Beginning January 1 Post & Lester will conduct a wholesale as well as a retail branch in Boston. The old quarters in Boylston street will be given up and new addresses will be: Wholesale, 288-290 Devonshire street; retail, Park Square. Mr. Thompson will continue as manager with charge of both places, while Russell Green will be chief of staff of the retail department.

Hardy Moves to Larger Quarters.—The R. E. Hardy Company, manufacturers of the Sta-Rite plugs and other accessories, have been obliged to increase their factory space. This has now been tripled and their office and factory address changed to 201 Thirty-seventh street, Brooklyn, the New York office at 25 West Forty-second street being continued.

Jewel.—The Forest City Motor Car Company, of Massillon, O., manufacturers of the Jewel, has added these agencies to their list: Rhodes Implement Company, Kansas City, Mo., and W. M. Kidwell, Savannah, Ga. The former will have the territory of Western Missouri, Kansas and Oklahoma, while the latter will look after Savannah and vicinity.

New Agencies for Goodrich Tires.—The B. F. Goodrich Company, of Akron, O., has established agencies at Kansas City, Minneapolis, Atlanta, and Pittsburg. The

Atlanta office is located at 64 South Pryor street, and will be managed by E. V. Wilkinson. The Pittsburg branch is at 5900 Penn avenue, and will be in charge of H. L. Banker.

Mitchell, Philadelphia.—In pursuance of its plans to offer every facility to Mitchell owners, not alone in Philadelphia, but in the nearby towns as well, the Penn Motor Car Company, agents in the Quaker City, has just opened a branch in Media, Delaware county, and placed it under the charge of J. H. Fleming.

Motor Truck Company Expands.—William H. Murphy, of Ithaca, has acquired a quarter interest in the Chase Motor Wagon Company, of Syracuse, N. Y., which has recently been reorganized with an increased capital stock. Mr. Murphy, who has been appointed secretary and a director of the company, will have charge of the sales department.

Pennsylvania and Gyroscope, Boston.—Among the new companies in Boston, is the Auto Motor Company, who have just opened a salesroom at 12 Park Square. The company will handle the Pennsylvania, and George H. Lowe, of the company, will personally handle the Gyroscope.

Reo, Southern States.—After December 1, the Reo will be represented in Tennessee, West Virginia, Kentucky, and Southern Indiana by the Renner's Automobile Company, of Louisville, Ky. This company will also have the Louisville agency for the Haynes.

Oldsmobile, Kentucky.—The Oldsmobile Company, of Louisville, Ky., is now a branch of the factory and has established agencies at Nashville, Chattanooga, Memphis, and Knoxville, Tenn., and also at Birmingham and Mobile, Ala.

Oldsmobile, Du Bois and Johnson, Pa.—The Du Bois Repair Company will represent the Olds Motor Works in Du Bois, Pa., and the Johnstown Automobile Company will handle the same product in Johnstown, Pa.

Sultan Company Moves.—The Sultan Motor Company is now located in new and larger quarters at 249-251 West Sixty-fourth street, New York City.

PERSONAL TRADE MENTION.

George Ostendorf, well known in the automobile trade and for the past two years a traveling salesman for the H. H. Franklin Mfg. Company, of Syracuse, has left that company to become secretary and general manager in charge of sales of the Brunn Automobile Company, of Buffalo. This company as the Brunn Carriage & Manufacturing Company has a long-established carriage trade. They have recently branched out into motor cars and will handle the Franklin in 1909. While with the Franklin Company, Mr. Ostendorf traveled in New York and Pennsylvania.

F. C. Gilbert, sales manager of the Pope Motor Car Company at Toledo, O., who used his efforts toward the re-establishment of the business during the period of receivership, has decided to resign from the company, severing his connection therewith early in January next. Mr. Gilbert has not decided upon his future plans, and at present is located at 2268 Parkwood avenue, Toledo.

Bertram Bailey has accepted a position as engineer with the Four Traction Automobile Company, of Mankato, Minn., manufacturers of four-wheel drive touring and commercial cars. Mr. Bailey was formerly with the Bailey Automobile Company, of Springfield, Mass., turning out two-cycle cars.

Herbert Bingham.—The G-L Economizer Company, of 1412 Times building, New York City, announces to the trade that Herbert Bingham has severed his connection with said company, having resigned as secretary and general manager of the same.

R. J. Skelton, who was formerly with the Chadwick Engineering Works, at Pottstown, Pa., has now assumed the position of city sales manager of the Philadelphia Olds Motor Works branch.

Albert A. Lamb has accepted the position of general manager of the J. S. Griffen Company, of New York City. Mr. Lamb leaves the Michelin Tire agency at Newark to take up this new work.

M. B. Hatch, the Buffalo agent for the Chalmers-Detroit, has added another good man to his list in the person of Harry C. Bacon, formerly with the Buick agency.

OBITUARY.

Mrs. W. McK. White, wife of the well-known automobile editor of the Philadelphia Times, died in Philadelphia recently of pneumonia after a two weeks' illness. Mrs. White apparently was out of danger, but suffered a relapse, which terminated fatally. Mr. White has the sympathy of many friends in the industry.

R. Lindsay Coleman.—One of the pioneers in the automobile world, and formerly a leading figure in the bicycle industry, died recently at his home in Somerset, Va. Until its comparatively recent failure, he was at the head of the National Battery Company, of Buffalo, N. Y.

TAXICABS AND TRANSIT.

St. Louis.—The Mississippi Valley Automobile Corporation, of St. Louis, Mo., according to J. H. Phillips, vice-president, will start this coming week an up-to-date line of taxicabs. The present plans include the immediate use of five cars, the remainder of a lot of 25 being put into service as they arrive. The cars will be equipped with the Popp taximeter and the fares charged will be the same as in New York and Chicago. The company have taken a large shop on Olive street in the heart of the automobile district.

Denver.—A taxicab company is to be started in Denver, Colo., on or about January 1. The new company has elected these officers: President, F. A. Austin; vice-president, E. W. Reynolds; secretary, treasurer, and general manager, B. J. Reynolds.

Bridgeton, N. J.—The citizens of Bridgeton are interested in the formation of a motor 'bus line between that town and Salem.

GARAGE NEWS OF ALL KINDS.

Pittsburg, Pa.—A. H. McKellit and R. E. Dinger have bought the garage and business of the Central Automobile Company at 5909 Centre avenue, East End. Fred D. Rathbun, a well-known automobile salesman for the Columbia Company, of Hartford, will be in charge. The retiring partners, C. L. Seeley and C. D. Messenger, will go into other business.

Sag Harbor, N. Y.—William Blacklock, Sag Harbor, Long Island, has purchased three lots on lower Main Street, near the railroad terminal and will start work on a new brick garage and machine shop.

Cincinnati, O.—Among the latest to announce a new building is the Cincinnati Automobile Company, agents for the Peerless, Pope, Hartford, and Oldsmobile cars.

Baltimore, Md.—The Zell Motor Car Company, of Baltimore, Md., is having plans prepared for a three-story 50 by 100 garage on Mt. Royal avenue.

Redondo, Cal.—Work has been commenced on the erection of a new garage for the Pacific Motor & Automobile Company, of Redondo, Cal.

Des Moines, Ia.—The Capital Automobile Company, Grand avenue and Eighth street, has just commenced work on a new building.

BUSINESS DIFFICULTIES.

New York City.—Schedules in bankruptcy of Max Wineburgh as the American Automart, supplies and a garage at 1621 Broadway, New York City, show liabilities of \$14,181 and nominal assets of stock, etc., totaling \$6,950. Outstanding accounts cannot be figured, because the firm's books were stolen.

Charlotte, Mich.—The Dolson automobile plant and real estate will be sold at auction by Receiver Hathaway. It is probable that the Charlotte banks, the heaviest creditors, will bid in the property. Liabilities amount to approximately \$140,000.

Hartford, Conn.—A petition in bankruptcy has been filed against the Auto Body & Top Mfg. Company, of Hartford. Liabilities \$4,641, assets \$9,513.

THOMAS AGENCIES FOR 1909.

Among the concerns which have announced the dealers who will push their product for next year is the E. R. Thomas Motor Company, of Buffalo, who swing into line with no less than 75 authorized agents. These are: Albany, N. Y., Auto Storage & Trading Company; Akron, O., Union Auto Garage Company; Austin, Tex., Ewell Nalle; Atlanta, Ga., F. C. Steinhauer; Boston, Whitten-Gilmore Company; Baltimore, Motor Car Company; Binghamton, N. Y., L. R. Clinton; Brattleboro, Vt., Manly Bros.; Beatrice, Neb., Wm. Steffen; Boise, Ia., Randall Dodd Auto Company; Chicago, W. W. Shaw Company; Cleveland, Auto Shop Company; Chattanooga, Tenn., F. G. Joyce Auto Company; Denver, Colo., Mathewson Auto Company; Davenport, Ia., Iowa Auto & Tire Company; Des Moines, Ia., Moyer Auto Company; Duluth, Minn., Mutual Auto Company; Dubuque, Ia., Wallis & Culbertson; Detroit, Grant Bros. Auto Company; Erie, Pa., Murphy Bros.; Ennis, Tex., Earl Fain; Glens Falls, N. Y., Glens Falls Auto Company; Harrisburg, Pa., Ideal Motor Car Company; Hartford, Conn., Palace Auto Station Company; Huntington, W. Va., L. A. Walcott; Indianapolis, Indiana Auto Company; Jamestown, N. Y., Jamestown Garage Company; Kansas City, Mo., Central Auto & Livery Company; Kalamazoo, Mich., W. E. Kidder; Louisville, Ky., John M. Strauss; Los Angeles, Cal., R. A. Brassey; Minneapolis, Minn., Barclay Auto Company; Memphis, Tenn., Memphis Auto Company.

To continue with the agents in the United States there are: Milwaukee, Wis., W. L. Hibbard Motor Car Company; Newark, N. J., Harry S. Houtt Company; New Haven, Conn., W. A. Maynard; New Orleans, Crescent City Auto Company; New London, Conn., New London Auto Station Company; New Castle, Pa., C. E. Smith Hardware Company; New York City, Harry S. Houtt Company; Oklahoma City, Okla., Buick Oklahoma Auto Company; Omaha, Neb., H. E. Frederickson; Oil City, Pa., W. P. Lucas; Portland, Me., J. A. Dowling; Philadelphia, Pa., Bergdoll Motor Car Company; Portland, Ore., H.

L. Keats Auto Company; Peoria, Ill., J. H. Bontjes & Co.; Providence, R. I., Davis Auto Company; Pittsburg, Pa., Pittsburg Auto Company; Poughkeepsie, N. Y., J. van Benschoten; Portsmouth, O., W. I. Friel; Punxsutawney, Pa., F. O. Freas; Reading, Pa., Penn. Auto Company; Rochester, N. Y., A. V. Hart; St. Louis, Mo., Park Auto Company; San Francisco, Cal., Pioneer Auto Company; Scranton, Pa., Scranton Auto Company; Syracuse, N. Y., Syracuse Auto Cab Company; Springfield, Mo., Colonial Motor Car Company; Sioux City, Ia., H. B. Groves & Co.; Saginaw, Mich., Norris Auto Company; Topeka, Kan., N. S. Wear; Terre Haute, Ind., Terre Haute Auto Company; Toledo, O., Kirk Bros. Auto Company; Utica, N. Y., Utica Motor Car Company; Vincennes, Ind., J. N. Dyer; Worcester, Mass., L. W. Locke; Washington, D. C., Motor Car Co.; Williamsport, Pa., E. Keeler Company; Youngstown, O., Standard Auto Garage Company.

In South and Central America and the Philippines by these agents: Argentine Republic, Pratt & Cia.; Mexico City, Mex., Moher & De Gress; Honolulu, H. I., Van Ham-Young Co., Ltd.; San Juan, P. R., Wm. J. Wulf.

RECENT INCORPORATIONS.

Maxwell-Briscoe Motor Vehicle Company, St. Louis, capital \$15,000 to buy and sell automobiles. Incorporators are V. Heinrich, L. L. Milks, H. M. Paine, of St. Louis; J. J. Handley, of Newcastle, Ind.; Benjamin Briscoe and J. W. Wellington, of Tarrytown, N. Y. This company has plans completed for the erection of a building 100 by 150, to cost \$15,000, but for the present will have its headquarters in the American Garage Co.'s building.

Pierson Motor Supply Company, New York City, capital \$20,000, to manufacture motors, engines, machines, automobiles, cars, wagons and boats. Incorporators: F. W. Mills, H. M. Brown and E. J. Forhan, 154 Nassau street.

Hurlburt Company, Portland, Me., capital \$400,000, to deal in automobiles and carriages of all kinds. Incorporators and officers: President, C. E. Eaton; treasurer, T. L. Croteau; clerk, J. E. Manter, all of Portland.

Grabowsky Power Wagon Company, Buffalo, capitalized at \$25,000, to manufacture and sell automobiles, power wagons and motor boats. J. D. McDonald, J. F. Valley and John Moore are interested.

A. J. Deer Company, Hornell, N. Y., capitalized at \$120,000. Buffalo and Hornell men are interested in this company, which will manufacture motors, electric novelties, machinery and dynamos.

Bradley Tire Protector Company, Fort Worth, Texas, capital \$20,000, to manufacture steel tire protectors. C. E. Bradley, Houston street, is secretary.

Self-Loading Wagon Company, New York City, capital \$25,000, to manufacture motors, engines, machines, cars, wagons and boats.

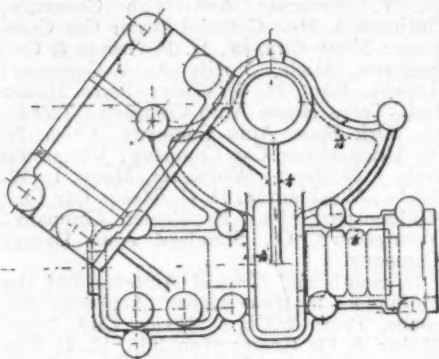
Butler Electric Clutch Company, Yonkers, N. Y., capital \$50,000, to manufacture elastic clutches invented by W. W. Butler.

Lexington Motor Car Company, Lexington, Ky., to conduct a livery and garage, and also assemble a car to sell at \$2,500.

Boutjes-Hayes Automobile Company, Peoria, Ill., capital \$2,500, to manufacture automobiles, parts and accessories.

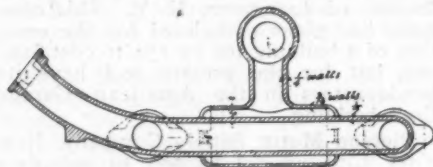
INFORMATION FOR AUTO USERS.

Something About Hess's Steel Castings.—Since 1867, when the first steel castings were used for crossing-frogs by the Philadelphia & Reading Railway, from the plant of William Butcher down to the present time, steel castings have served for many useful purposes, but they would have



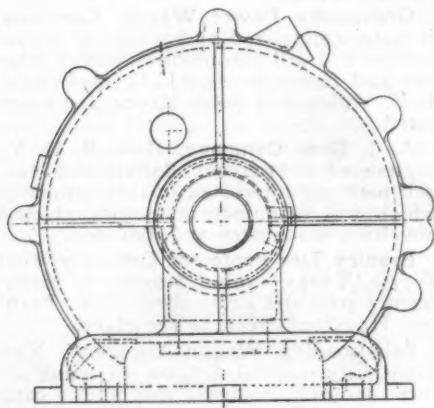
HESS STEERING GEAR HOUSING.

had a far wider range of application were it not for the difficulty involved in obtaining sound castings in intricate shapes, or in the cases involving complicated cores. In late years, because of a better understanding of the situation, the percentage of "wasters" has been much reduced, primarily



END PIECE OF TRANSMISSION CASE.

ly, in view of perfected details in design that indicated more nearly uniform cooling conditions. In the process of evolving steel castings, while uniform cooling is particularly desirable, the fact remains that the "shrink" is not only more than that attending cast iron, but it is far less regular as



EXHAUST MANIFOLD WITH INTAKE PREHEATER.

well, and so it seems the steel casting problem has remained formidable, notwithstanding the improvements wrought.

Henry Hess, of Twenty-first street and Fairmount avenue, Philadelphia, has submitted illustrations of intricate specimens of steel castings which he claims can be readily made by a new process, recently

acquired by him, during a sojourn in Germany. In the language of Mr. Hess, the substance of the project is clearly set forth as follows:

"Steel castings ranging from dead soft to self hardening steel, weldable, any specification realizable in wrought or forged material, any section; thick, thin, abrupt change from thick to thin, clean surfaces, no pits, absolutely solid 3-32 below skin, simple or most complicated coring, any shape that can be forged, or cast in any material."

Mr. Hess states that pending the establishment of a foundry in America for the purpose of furnishing castings in accordance with the above claims, deliveries will be made directly from Germany with a view to filling orders. At any rate, the requirements of American manufacturers will be carefully looked after.

Prest-O-Carbon Remover.—The pedestrian hates a smoky exhaust. If he was "onto" his job, the chauffeur or man running the car would dislike it just as much, for it means work for him later. That is, a smoky exhaust is caused by a surplus of oil or of fuel, usually the former, and this, if continued for a long time, will result in carbon deposits. These may be in the cylinder itself, on the piston head, or on the valves. Whenever they occur it means dismantling the motor and scraping them. At least it has meant this in the past, but now we have a new solvent for the carbon, known as a carbon remover, which may be inserted in the cylinder by means of an oil gun or poured in through any suitable opening. Among the carbon solvents that have been proved good is the Prest-O-Carbon-Remover, Prest-O-Lite Company, Indianapolis, Ind. This is put up in liquid form in sealed cans holding respectively a quart, half gallon, or gallon, and should stand for 30 minutes. This works by softening the deposits, then when the engine is started the loose particles of carbon are blown out through the exhaust valve opening. As this saves the work of tearing the whole engine down, cleaning, and assembling it again, with the consequent loss of the use of the machine for a couple of days, these solvents will doubtless become very popular with automobilists.



PREST-O-CARBON REMOVER.

Grand Prix Horn.—The Motor Car Equipment Company, of 1727 Broadway, New York, states that its new "Grand

Prix" wheel-shaped horn is now in great demand. As may be seen from the cut, this horn has a very odd shape, and has also good noise-making qualities. It

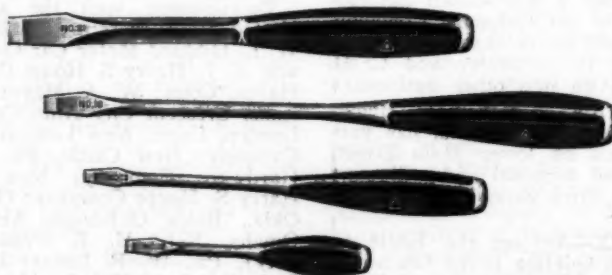


"GRAND PRIX" WHEEL-SHAPED HORN.

makes a fine racing horn because it can be blown in the face of the strongest wind, and is also admirably adapted to low racing tourabouts. This horn will undoubtedly appeal to automobilists desiring a novelty as well as a serviceable article for practical use.

Acheson Graphite Greases.—The International Acheson Graphite Company, of Niagara Falls, N. Y., is making what it believes to be a very superior line of Graphited Greases. The company blends very soft, pure, amorphous, unctuous Acheson-Graphite with a high grade grease, the product being one which it claims is very far superior to graphited greases made of natural graphites, as these latter contain friction-creating impurities, while the graphite is guaranteed at least 99 per cent. pure, thus being the purest and best graphite in the world for lubricating purposes. The claim is made that these new Graphited Greases will do far more work than any other grease because the Acheson-Graphite used is a true lubricant in itself, the grease simply acting as a carrier. Acheson-Graphite, Grade "1340," is claimed by the makers as the world's purest and best graphite for lubricating purposes.

B. & S. One-Piece Screwdrivers.—All steel one piece screwdrivers in eleven sizes, specially designed for automobilists' use, are the latest productions of the Billings & Spencer Company, of Hartford, Conn. For more than a quarter century the "B. & S." trade mark has been a synonym for high class products, and the new line of drivers will meet a ready welcome with discriminating buyers. They are made in one piece, and drop forged of steel, the handles being of a new and special design which insures lightness, a positive, easy grip, which cannot get out of order, become loosened, or lost. As will be seen by the illustrations, the handle portion has the section of a cross, but on the heavier models the sides are left solid, giving a square section on which a wrench may be used. The smallest size is 5 inches in length and the longest 18 inches for general use. In the machinists' sizes with squared handle sections, the lengths are 9 1-2 and 10 1-2 inches.



ONE PIECE "ALL STEEL" AUTOMOBILE B. & S. SCREW DRIVERS.